

# American Forestry

Vol. 22

JANUARY, 1916

No. 265



THE WHITE OAK

# The American Forestry Association

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## Declaration of Principles and Policy of *The* American Forestry Association

**IT IS A VOLUNTARY** organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

**IT IS INDEPENDENT**, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

**IT ASSERTS THAT** forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

**IT DECLARES THAT FORESTRY** is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

**IT RECOGNIZES THAT** forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

**IT WILL DEVOTE** its influence and educational facilities to the development of public thought and knowledge along these practical lines.

### It Will Support These Policies

**Federal Administration and Management** of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

**State Activity** by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

**Forest Fire Protection** by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

**Forest Planting** by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

**Forest Taxation Reforms** removing unjust burdens from owners of growing timber.

**Closer Utilization** in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

**Cutting of Mature Timber** where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

**Equal Protection** to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

**Classification** by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

# AMERICAN FORESTRY

*The Magazine of the American Forestry Association*

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# THE DAY OF NO TIMBER

Is farther away now than the ultra-conservationists ten years ago said it was when they spread an alarm of exhausted supply.

**T**HE theory of exhaustion has been dismissed. Wood is still abundant. It is still and always will be the warm, friendly material that makes four walls a cosy cottage or a magnificent mansion. Our regard for it is inherent. Our children will continue to use it because its adaptability, beauty of finish and sound absorbing qualities give it a home-making charm that no other material possesses.

**A**ND the uses of wood are multiplying phenomenally. We are just now coming to know its real values and save them. Practical by-product utilities that represent more than 60 per cent of the usable value of trees are now known, in addition to lumber which utilizes only one-third. Others will be found. With added use there is added worth.

**L**UMBER need not go higher in cost to consumer to make profitable for all time the ownership of timber. Forest protection, new uses, close utilization, efficient management and economical distribution will constantly add to the value of stumpage and eclipse the "overhead." Stumpage—the raw material—will take the gain.

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# American Forestry

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## The American White Oak

*Identification and Characteristics*

By S. B. DETWILER

THE oak possesses a sentimental charm for mankind, perhaps because in days of old, it was closely associated with worship of the gods. Instinctively we venerate its character as symbolic of strength, permanence and independence. In Europe and America are many historically famous oaks, and the poets from Virgil to Longfellow have celebrated "Jove's own tree."

Our high regard for the oaks does not depend alone on sentiment, since the value of the wood, bark and acorns rank these trees commercially as our most important hardwood. In the "Faëry Queen," Spencer speaks of "The builder oak, sole king of forests all," in referring to the use of oak in the enduring structures of past ages.

Nearly 300 species of oak are known in the northern hemisphere; about 55 are native to North America, and more than half of them are commercially important. Lumbermen and botanists agree in recognizing natural divisions of the oaks into two

classes. The species in the white oak group ripen their acorns in one year, the leaf margins are free from bristles, and the bark and wood are usually light colored. The red or black oak group requires two years to mature their fruit, the leaves have sharp, bristle-like points on the margins, and the bark and wood are darker in color than in the white oak group.

The white oak is our most important oak and is one of the most widely distributed and most used hardwoods in the United States. It grows from Maine to central Ontario and Minnesota, south to Florida and Texas. It is most abundant and best developed in the central Mississippi and lower Ohio basins, and on the western slopes of the Allegheny Mountains.

Forest grown white oak has a long clean trunk that tapers very little until its branches into a comparatively narrow top. It may attain a height of 150 feet, with a trunk 8 feet in diameter, free of branches for 60 feet or more. Usually the trees



From *Pennsylvania Trees*, by J. S. Illick.

### THE WHITE OAK

1. Flowering branch with immature leaves showing the (s) staminate blossoms and (p) the pistillate blossoms. 2. A staminate or pollen bearing flower, enlarged. 3. A pistillate or seed bearing flower, enlarged. 4. Branch with full-grown leaves and acorns, about one-half size. 5. Acorn cup, about one-half size. 6. The base of the acorn. 7. The cross-section view of the acorn. 8. Germinating acorn with its young root and shoot. 9. A winter branch. 10. The end of a winter branch showing the bud with the over-lapping scales, a leaf scar with bundle scars and lenticels enlarged. 11. Cross-section of twig showing five-sided pith, the wood with medullary rays and the inner and outer bark enlarged.



TRUNK OF A WHITE OAK

The bark of a mature tree like this is about two inches thick. It is usually light grey or white, shallowly fissured into flat, irregular scales often very loosely attached. Occasionally the bark appears roughly ridged and without scales. On the smaller branches the bark is light green to reddish-brown.

are 2 to 4 feet in diameter and 60 to 100 feet in height. In the open the trunk is short, often of large size; the top forms an impressive dome with many great branches, gnarled and twisted, that convey the idea of sturdiness and strength.

The bark of the mature trunk is a pale gray, with shallow fissures and flaky scales. Occasionally it is roughly ridged or plated, and without scales, and may vary in color from dark grey to nearly white.

The pith of the twigs is shaped like a five-pointed star. The bark of young twigs is light green or reddish-tinged, changing in winter to reddish-brown or grey, and is covered with numerous small, raised breathing pores.

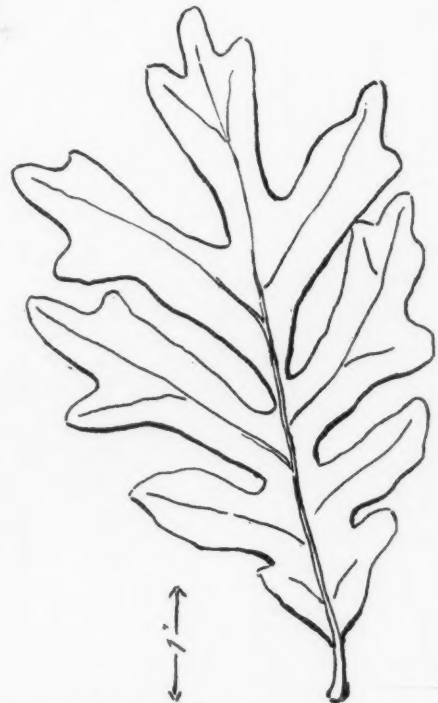
The buds stand singly on the sides of the twigs. If a line is drawn from bud to bud, it will be seen that each fifth bud stands directly above the one from which counting begins, and the line forms a spiral of two turns around the stem. Several buds are clustered at the ends of the twigs. All of the buds are small, blunt-pointed and more or less globular, and are covered with tiny overlapping scales.

The leaves are 2 to 4 inches wide, 5 to 9 inches long and have an egg-shaped outline, with the broad end farthest from the branch. The base of the leaf is wedge-shaped, with a short stem. The edge of the leaf is cut by rounded notches into divisions or lobes, ranging in number from 3 to 9, but usually 7. The top of each lobe is rounding and free from bristles. Sometimes the indentations are very slight, giving the margin of the leaf a wavy outline, in other cases they extend nearly to the mid-rib of the leaf.

The leaves unfold late in the spring. The pioneer planted his corn when the white oak leaf had opened to the size of a mouse's ear. At first the leaves are a delicate rose-pink, and covered with silvery down. When full grown they are bright green and smooth above, pale, smooth and occasionally shiny beneath. For a short time late in the autumn the color of the foliage changes to mingled shades of subdued reds and purples. Soon the color fades and the leaves become brown and sear but often remain clinging to the branches, especially on young trees, until the winds of winter finally whirl them away.

In May, when the leaves are about one-third grown, two kinds of flowers appear on the branches. The pollen-producing flowers are in clustered catkins that droop, fringe-like, from the branches. These flowers are yellowish, and inconspicuous. Each one of the flowers which produce the acorns appears to be composed of a number of tiny reddish scales from which three bright red tips protrude. They are borne singly or several on one stem, in the axils of the leaves. At first very small, after they are fertilized by the pollen they develop into a nut, the familiar acorn.

The acorn matures early in the fall. The bowl-shaped cup encloses about one-fourth of the nut and is covered with numerous brown scales. The nut is light brown, shiny, about one-third of an inch long, and rounded at the tip. The white meat of the nut is much sweeter in flavor than most acorns and is a staple food for squirrels, wild turkeys, hogs and other animals, wild and domestic. Even the Indians and the early colonists ate white oak acorns, after first boiling them. Seed years for white oak



Courtesy of Manual Arts Press.

LEAF OF THE WHITE OAK

The leaves are from five to nine inches long, two to four inches wide, with three to nine, but usually seven, ascending lobes; when full grown they are thin and bright green above and pale and smooth below.

occur every 4 to 7 years, when the yield of mast is heavy. In other years the crop is light.

White oak can maintain itself on any soil except cold, wet land with an impenetrable subsoil, but it prefers the deep, rich and porous loam soils of bottom lands, flats, coves and gentle lower slopes. It may form practically pure forest, but is usually mixed, in groups or single trees, with chestnut, tulip poplar, red oak, beech, basswood, and occasionally with hemlock and white pine.

White oak grows more slowly than red oak at first, but growth is uniform and persistent. Average growth in the forest is one inch in diameter, and 5 to 8 feet in height in ten years. Even under the better conditions of a well cared for plantation, it requires from 125 to 200 years to reach maturity. White oak trees under forest conditions do not bear seed until from 40 to 80 years old. The acorns roll down steep slopes to a considerable distance from the tree; squirrels, chipmunks, crows and jays are also active in distributing them.

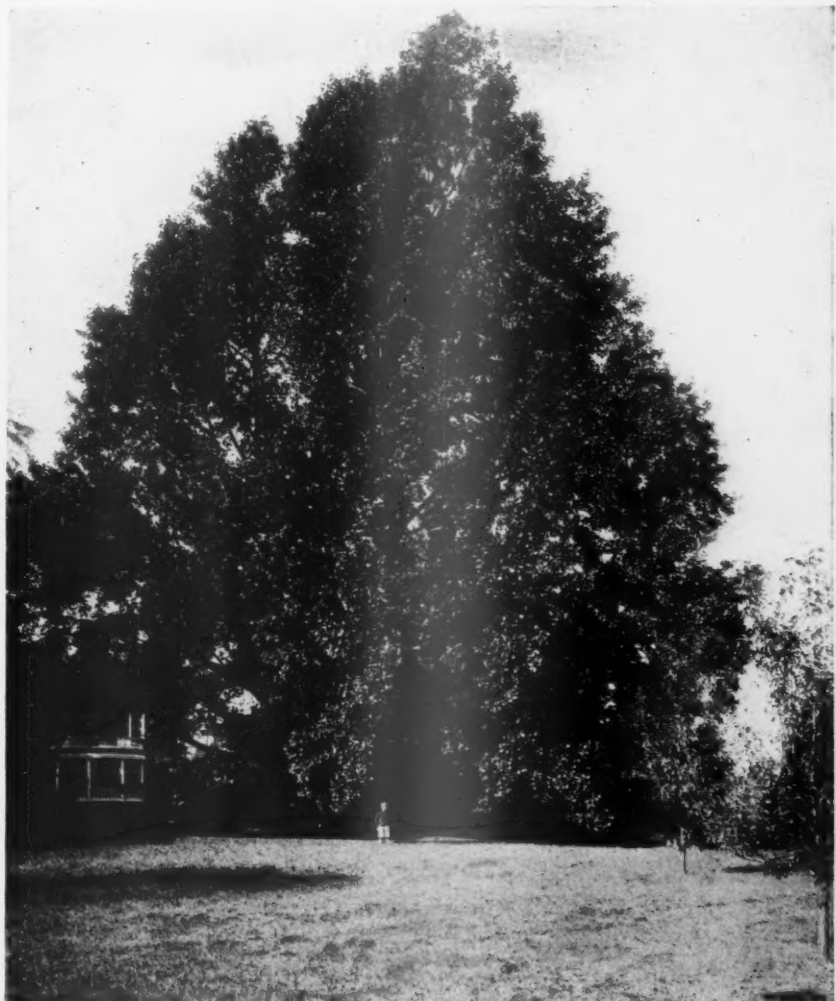
It is probable that not more than one acorn out of every ten in the forest escapes destruction by animals, insects and fires. The acorn germinates in the fall. It first sends a strong tap root deep into the soil, and the part of the tree above ground grows very slowly for a number of years until a strong, branching root system is developed.

In planting for timber production, white oak is less valuable than red oak, because of its slow growth. On account of the deep tap root, it is difficult to transplant young white oaks successfully, and better results are obtained by planting the acorns where the trees are to grow permanently. Nuts should be collected from middle-aged trees. There are about 100 acorns to a pound of seed, or about 9,000 to a bushel. If care is taken to secure acorns that are free from insects, a bushel of seed will produce about 7,500 trees. About 12 bushels of acorns per acre will be required for broad-cast sowing. A better method is to drop the acorns in shallow furrows, or plant them in spaces cleared with a grub hoe, about 6 feet apart. They should be covered with 2 or 3 inches of soil. Mixed plantings of white oak with white pine, white ash or red oak will give better results than pure planting.

Young seedlings will grow for a few years under dense shade,

but they soon die if deprived of an abundance of light. For this reason, the forester encourages the growth of young oaks by thinning out less valuable trees. Forest fires are the chief enemy of white oak in the forest or plantation. These destroy the leaf litter and humus which nature provides to hold the moisture in the forest soil, and they also cause scars at the bases of the trees. In consequence, the vitality of the trees is weakened, inviting attack by insects and wood rotting fungi. Its most destructive insect enemy is the oak timber worm or pin worm. Several fungi are active in causing heart rot, or dote. White oak trees may also occasionally suffer injury from wind shakes and frost cracks.

White oak is a valuable tree to plant for ornamental purposes, provided it has plenty of space and good soil for its development. It does not thrive under the adverse conditions of street planting nearly so well as red oak or pin oak, and because of its spreading habit, it is better



A FINE WHITE OAK SHADE TREE

In summer one can distinguish the White Oak very readily by its loose scaly, grayish or white bark from which it takes its common name and by its deeply round-lobed leaves with a smooth and pale lower surface when mature. In winter it has some characteristics apparently in common with some other oaks but can be distinguished from the Red, Black, Scarlet, Chestnut and Yellow Oaks by its obtuse, rather small buds; from the Swamp White Oak by the slender, reddish to grayish twigs and the absence of dark, loose peeling flakes on the branches; from the Post Oak by the absence of greenish rusty pubescence on the twigs; from the Pin Oak by the absence of stiff lateral pins on the branches and the more obtuse buds; from the Bur Oak by the absence of corky wings on the branches. In addition to these characteristics the acorns and leaves which often persist will aid considerably in recognizing the different species.





THE AREA OF WHITE OAK

The white oak is tolerant of many soils, growing on sandy plains, gravelly ridges, rich uplands and moist bottom lands. It reaches its best development in rich, moist soil.

suited to large estates or the open country. It is a noble tree and might frequently be planted to advantage where faster growing species are chosen. Although it grows slowly, it is very interesting to watch the development of a white oak growing in the open. In comparatively few years it begins to show its characteristic form, that in time becomes magnificent and impressive. It is a tree that will be enjoyed not only by the planter but by his children and his children's children.

The wood of white oak is the most valuable of all oaks. It is ash grey in color, close-grained, hard and tough. It weighs about 46 pounds per cubic foot and has exceptional strength. It is durable in the soil. The average life of a white oak railroad tie is 8 to 9 years, and as a fence post the wood lasts 10 to 15 years. Unlike the wood of red oak, it will absorb very little creosote. In the open air the

wood shrinks considerably and is liable to check badly unless carefully dried. Its most important uses are for sawed lumber, railroad ties and staves.

Settlements commenced in the United States in the parts where the oak was most abundant. The colonists encountered the wood as soon as they landed in this country. It was less abundant in New England and in the extreme south than in the middle colonies; yet there was oak in New England and it extended to Florida. It is said that the "Charter Oak" in Connecticut was a white oak; and the fact that it was hollow to a sufficient extent to afford concealment for the precious document, and that it stood 200 years after that time, is proof of the strength of oak and of the tenacity with which it holds out against enemies within and without.

The settlement and development of the country were made possible—at any rate were made easier—by liberal use of the splendid forests of oak. This wood more than any other fenced the farms of the pioneers, built their houses, barns, dams, mills, and bridges; supplied charcoal for forge and furnace, and fuel for the winter fires throughout the hardwood regions of the United States. The chroniclers of early explorers and colonizers abound in praises of valuable oak. The Anglo-Saxon entered the American wilderness looking for land and he learned that the oak guided to the best. The pine was on the sand, but the oak's preemption of the humus soils was fairly complete. The dairies, journals, and biographies of such experienced and observing woodsmen as Christopher Gist, Daniel Boone, Isaac Van Meter, and General Washington show how much confidence they placed in oak timber as a guide to rich land, while searching for locations for settlements and colonies, or while exploring routes for trade.

## Commercial Uses of White Oak

WHITE OAK in the United States, it is believed, exceeds in quality any other hardwood, but no figures are available showing the total amount of the wood remaining. Estimates based on partial measurements have placed it at 50 billion feet. Assuming that to be within reason, it is possible to calculate within rather wide limits the length of time it will last at the present rate of cutting. In 1910 the total sawmill output of all oaks in this country was 3,522,098,000 feet, board measure. Staves and hewn railroad ties would probably bring the total up to four billion feet. Statistics are not compiled in form to show species of oak separately, but perhaps one-half, or two billion feet is white oak, and that represents the annual drain upon the country's supply of that species.

On that basis the white oak will not hold out much longer than twenty-five years.

High prices and the increasing difficulty of filling orders for first-class stock indicate that scarcity is already felt. No extensive virgin white oak forests remain to be exploited; but small virgin bodies of this timber exist

in some of the Appalachian Mountain States, and west of the Mississippi, but they become smaller and fewer year by year, while the demand for white oak increases.

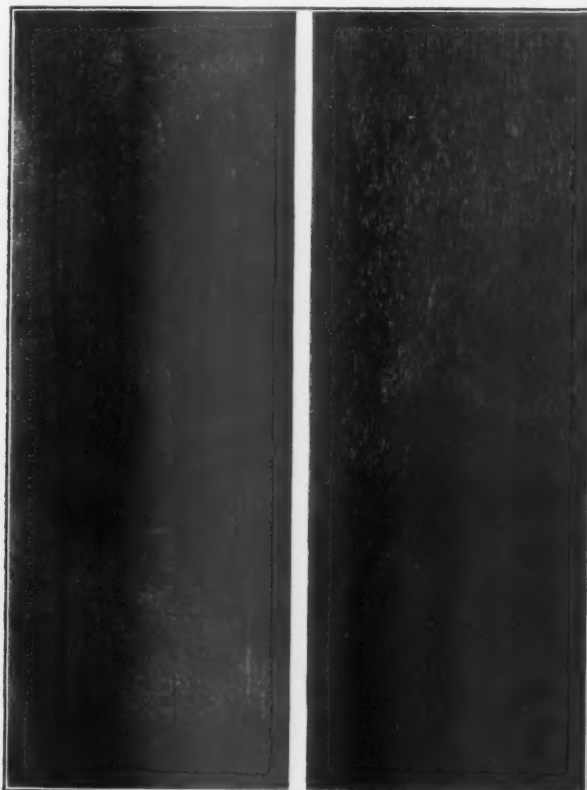
When the early pioneer located a site for a cabin he called upon the oak for service, and it answered his call. Its logs, hewn or round, built his house. The building was roofed with clapboards rived from a tree felled in his dooryard. Oak puncheons, often untouched by broadax or adz, formed the door, floor, latch, beds, benches, and the chimney. The loft floor, when there was one, was laid of thinner puncheons or thicker clapboards; for the line between the two kinds of commodities was not definitely fixed. Choice trunks, mauled into rails, fenced the land on which they had grown. White oak, more than any other wood, was shaped for rough vehicles, such as ladder sleds, log sleds, block-sleds, carts, and thimbleskein wagons. The frames of harrows and sometimes the teeth were of oak. It was the wood of which the moldboards of plows were fashioned, also the beam, handles, the whiffletrees, singletrees, and all else pertaining to the plow except the point and

cutter. It was the wood for oxboes, sandspikes, and levers. Farmers made feed troughs and licklogs of it for horses and mules. It was selected because of its hardness. The animals did not gnaw it to pieces as they did troughs of softer woods. For a similar reason it was made into corn and wheat bins, because such bins were seldom gnawed through by rats. It was the principal material for flax brakes in early times when nearly every house had one, and tow linen was manufactured by hand in most cabins. The old flax brake has held its ground to this day in some of the isolated regions of the southern Appalachian mountains. Inventors have patented nearly three hundred machines for breaking flax, and still the old style, crude, white oak contrivance is not entirely obsolete. The fly of the old Bradford printing press, the first in New York, was of white oak, and it has survived the



SHIP AND BOAT BUILDING

A century ago in building large vessels wood was the most important and valuable material used, but the substitution of steel construction has progressed so rapidly that at the present time the use of wood in this class of boats is only incidental, answering principally for decking, interior finish, ships' furniture, masts, spars, booms, etc. For smaller boats, however, such as yachts, launches, row boats, canoes and other pleasure craft, wood is still the raw material used. White oak is extensively employed for keels, ribs, stern posts, stems and in some instances for coaming for open cockpit boats and interior trim for cabin boats.



WHITE OAK

Tangential or bastard cut, in which the pith rays appear as interrupted dark vertical lines of different lengths. These should not be confused, however, with the vessels or pores which show as short vertical dotted lines seen also in the radial section.

Radial or quarter sawed section, the pith rays showing as conspicuous large flakes or irregular size. It is this so-called "silver grain" which makes quarter sawed white oak so attractive and desirable as a finish wood.

vicissitudes of time though long ago retired from active service.

The frontier wheelwrights and wagon makers drew heavily upon oak when they had the boundless wilderness to choose from with full license to take what they would. The chucking wagons which sustained their maker's reputation and their own on the rutted roads and rocky hills in early times, were oak-hubs, spokes, felloes, hames, bolsters, axles, standards, sandboards, and tongues. Lighter vehicles in late years brought hickory in, but the everlasting wagons of the frontiers were oak. The staunch felloes sustained the tires, which were in two or more pieces, and were bolted on. Wagons of that kind, strong as gun carriages, were made in Pennsylvania and in the South Branch Valley in Virginia, and they carried across the Allegheny Mountains the military supplies which accompanied Washington's ill-fated expedition to the Great Meadows in 1754, and Braddock's more disastrous one the next year. Those were the first wheeled vehicles to cross from the Atlantic slope to the drainage basin of the Mississippi River. Oak wheels trundled in the van of civilization's march toward the West in the early as well as in later years.

The homemade pack saddles and stirrups, with which horses were equipped for forest trails, were usually oak. Furniture was made of it centuries before quarter-sawing was invented and before stains and fillers for deepening the tones were thought of, or ammonia fumes were known. When whipsaws and the rude sawmills began to supplant the broad ax, oak became a frame material for houses. Massive old residences of New



PLANING MILL PRODUCTS

In house and other lines of building construction considerable attention is given to floors, those of hardwood generally being preferred. Both red and white oak are used indiscriminately for this purpose, together with maple and beech. Hardwood flooring is usually  $\frac{3}{4}$  inch thick, 1 inch to  $2\frac{1}{2}$  inches wide and both end and side matched. It is most often laid the same as standard flooring, except that a sub-floor of some soft wood is laid diagonally below it with deadening material between. For certain classes of floors, such as those of offices, show windows and stores, the parquetry designs are preferred. In such instances numerous other hardwoods which contrast in color are employed for borders.

England, New York, and farther south were frequently of that wood. Some of the venerable structures are standing yet, and their stability wins the admiration of all who see them.

Numerous instances of the enduring properties of white oak might be cited, but a few will suffice. The Westfall blockhouse, which was built in Tygart's Valley, Virginia, now West Virginia, as a defense against Indians in 1774, stood one hundred thirty-two years, and when torn down, its white oak logs showed few points of decay. In 1776, John Minear, a German from Pennsylvania, built a milldam in the same region, and a century afterwards the oak logs had decayed so little that the hewer's ax marks were clearly seen. The oak logs in which portholes were cut, in the blockhouse now standing in the center of Pittsburgh, on the site of Fort Duquesne, were remarkably well preserved though exposed to weather during nearly one hundred fifty years. White oak logs from Fort Henry, on the Ohio River, at Wheeling, under whose walls was fought "the last battle of the Revolution," September 11, 1782, were manufactured into picture frames one hundred six years after the fort was built. Most of the old warehouses in lower New

York, which were destroyed in the great fire of 1855, were of white oak cut in New Jersey at an early day.

The manufacture of white oak into salable commodities began very early in the history of America. Europe has but one commercial oak, and the first colonists in this country were surprised to find so many here, yet they knew but a small part of the total number. They were not slow in determining the best, and they picked white oak. For all practical purposes it was equal to the English oak, and being so much more abundant, and consequently cheaper, it soon formed portions of cargoes bound for the trans-Atlantic ports. A record exists of a shipment of oak panels from New York to Holland, in 1626. Sawmills were at work near the Hudson river one hundred sixty years before the first one on record appeared in England. Some of the American mills of a very early date operated from four to twelve saws, and at least one of the mills was built for wind power. One of the earliest commodities to go to Europe from the New World in considerable amounts was lumber. Most of it was white pine, some was red cedar, a little was sassafras, but part of it was oak felled in the valleys of the Hudson and the Delaware. The oversea lumber



trade was small in the first years, but it was one of the largest items in the earliest commerce. It was a peculiar circumstance that while rough lumber was going from American to England, dressed, cut, and fitted material for houses was occasionally shipped from England to America, accompanied by carpenters to put the material together upon arrival here. Some houses of that kind were built in Maryland.

Tight cooperage staves, which were nearly always of white oak, were among the first forest products of the United States. How much experimenting the first settlers did before they learned the value of white oak as a container for liquors is not known, but they were early in possession of the knowledge and made practical use of it. Various commodities were stored and shipped in the barrels made of American white oak, but some of the best of the wood was for the fine wines of the Canary Islands. The claim was then made and has since been often insisted upon that the wine was improved by long storage in oak casks. The users of barrels strongly insisted on having white oak, and the drain on convenient supplies was so heavy that experienced men declared years before the beginning of the nineteenth century that the supply could not last much longer. A New York trade committee in 1795 suggested reforestation of old fields to provide oak for the future. Long before that time measures had been taken in New Jersey looking to the regulation of the stave trade. In 1713 an export duty of \$7.50 per 1,000 was laid on pipes and \$5 on hogsheads. Four years later the duty was taken off, but was replaced in 1743 and remained until the Revolution.

Oak barrels at the present day frequently cross the ocean more than once. Some go to Russia where they are used as containers of oil, and these never come back. Others carry liquors to France, Italy, Spain, Turkey, and even Arabia. After they are emptied of their contents, they are refilled with wines of those countries and returned to America. When they have been emptied of their wines in this country they are frequently filled with vinegar and shipped once more. English ale is often shipped in American barrels.

White oak wood absorbs a considerable amount of the spiritous liquors in the barrels. When they are emptied it is found profitable to drive the alcohol from the wood in a specially constructed distillery where hot steam is the agent. The alcohol thus obtained is of high grade, worth \$100 a barrel. A single distillery in New Jersey



VEHICLES AND VEHICLE PARTS

Oak stands second in importance among the woods used for this industry, red and white oak being employed in about equal proportion. White oak enters into the manufacture of vehicle body frames and gear parts. The photograph shows oak spokes piled for seasoning in the plant of a large spoke and hub manufacturer.

is said to pass 250 old whiskey barrels a day through the hot steam process.

Barrels for alcoholic liquors are not the only white oak output of cooperage shops. Pork, oil, molasses, and many other kinds of barrels are manufactured. Some of these do not require the highest grade of oak, and staves of other kinds of wood are in use. The principal advantage of white oak over other woods, in addition to its strength, is that the wood is dense and seepage through the pores of the wood is very small. Barrels of a certain wood may hold one liquid with little leakage, and be entirely unfit for others. The dense summer wood, which forms a large part of the annual rings of growth of white oak, is the part of the wood which makes it exceptionally valuable for tight cooperage. The liquids can not seep through.

Small oak staves in early times were made into numerous vessels other than barrels, such as tubs, kegs, churns, and well buckets. The latter use was common. A bucket of that kind dips easily on account of its weight. "The Old Oaken Bucket," of Samuel Woodworth's well-

known poem, was probably made of Massachusetts white oak.

Salt barrels are made, and for a century have been made principally of white oak staves with hickory hoops. Two sizes are used, one of 280 and the other of 350 pounds. In Tennessee, and perhaps elsewhere as well, white oak trees, about ten inches in diameter, are worked into hoops for tobacco hogsheads. Only the sapwood and a little of the adjacent heart will answer the requirements. Smaller trees are useless and larger ones are too brittle.



FURNITURE

White oak is an important furniture wood, and supplies nearly 50 per cent of the total quantity of raw material used in this industry annually. The picture shows oak rocking chair parts ready for assembling.

#### BRIDGES AND PILING

In situations alternately wet and dry, white oak is one of the best obtainable woods. The long service which it gives has increased its use for piles, piers, wharfs, quays, seawalls, bulkheads, wingwalls, booms, milldams, forebays, aqueducts, penstocks, and headgates. The superstructure of wharfs and bridges, which are the parts always above water, are preferably of lighter wood than oak, but the cribs and piles on which the superstructure rests have more frequently been built of oak than of any other wood in regions where oak could be conveniently had.

Oak formed the keels, ribs, planking, and other heavy lower timbers of early American ships, white pine the masts, and other woods filled various places. Boston yards preferred white oak pins or treenails, but most others used locust. The gallic acid in the oak stained the wood if iron bolts were substituted for treenails, and prejudice against iron for that purpose was nearly universal, though evidence was wanting to show that the wood was hurt by the stain. At the present time iron bolts have nearly displaced treenails of all kinds of wood in ship building. English boat builders supplied their yards with American white oak, while insisting that European oak was better. The knees for large vessels

were usually of live oak, but were sometimes hewed from natural crooks, or roots of white oak. That was before the art of bending to the required shade was understood.

The increased use of iron and steel in modern ship building has not driven wood from that industry, though many vessels are constructed with comparatively little wood. The uses of white oak about the boat yard are many. It enters into planking, keels, and hulls. Canal boat bottoms are made of it, though the upper parts may be of Douglass fir, southern pine, or some other species which affords long timbers. Modern passenger vessels, though principally of steel, employ white oak in large quantities for interior finish.

Two hundred years ago in New England and New York, builders used it for its strength—and used much more than was necessary; but the modern architect and builder employ it for its beauty. They now put in beams and braces of cheaper material to give the necessary strength and stability to the structure; and they work the oak to produce artistic effects. Color schemes for finish are studied; and with stains, fumes, and fillers, attractive combinations are made which were once totally unknown to the house builder.

As a hardwood flooring material, white oak is second only to sugar maple in quality. It is worked into parquet flooring as well as the ordinary tongued and grooved pattern. Some of the finest floors are of quarter-sawn, but oak of that kind is commonly reserved for panels, wainscoting, beams, and columns. Oak mantels are one of the luxuries of modern houses. The stair is another piece of indoor architecture where the wonderful wealth and variety of the white oak's grain, figure, and color may be shown to excellent advantage. The newel posts, railing, spindles, steps, and capitals give the opportunity to display the fine finish of oak from every angle. Baseboards, grilles, blinds, picture molding, and curtain poles, add to the display of a well-finished interior of oak.

Houses were once roofed with oak shingles and clapboards, but that is seldom done now, although 20 million oak shingles were manufactured in the United States in 1907. Few of them were white oak.

Quarter-sawing became popular about 1885. By tilting the log in the process of converting it into lumber, the cut is made radially, that is, on a line from the heart to the sap. That cuts the medullary rays in such a way that their broad surfaces are exposed to view. These are the "mirrors" of oak—the bright patches which are so much admired in well-selected wood. Quarter-sawing opened a new era for oak. It was a wasteful method of manufacturing lumber, but prices were good.

The manufacture of fixtures calls for the highest grades of white oak, because it is a class of work meant largely for show, and no inferior material will pass. Fixtures, as the term is here used, include counters, show cases, saloon bars, built-in tables, desks, and partitions in banks, wall cabinets for stores, and other large cabinets. In no class of work can the massive beauty of oak be displayed to better advantage.

About one-fourth of all the furniture now made in the

United States is white oak. The substantial chairs, bedsteads, bureaus, and tables, which were once made by hand by rural workman before the modern factory with its machines was known, are now classed as antiques, but age has added to their value. Few fillers and finishers were then employed, and the natural grain of the wood remained unchanged. Solid oak furniture is not often made now, except the cheapest or the most expensive kinds. Common chairs, bedsteads, and tables are low priced, and of plain-sawed material; and expensive, deeply carved pieces are solid, because only thick, solid wood will display the carvings. The medium-priced oak furniture is practically all veneered.

Chair making is an industry almost separate and distinct from the manufacture of furniture, and while many woods are employed, oak is the most important. Chair factories often make nothing else, and they turn out large numbers of standard patterns, some very cheap, others of better grade.

Strength fits oak for certain kinds of musical instruments, and beauty for others. While oak figures in the manufacture of guitars, melodeans, orchestrions, and in racks and cabinets which form the furniture and equipment of the music room; but the most massive oak is seen in pipe organs for halls and churches.

White oak is not a handle wood to the same degree that hickory is, but it is much employed for certain kinds of handles. In some parts of the Atlantic coast it is used as ax handles. It is toughened for that service by boiling it in oil. The sapwood of saplings only is used, as the heartwood is too brash, and even the sapwood of large trees will not do.

Oil tanks of white oak are specially preferred, because the oil is liable to seep through most other woods. Enormous oak tanks were built in the oil fields of Pennsylvania and West Virginia in the early days of the development of oil fields in that region.

White oak out on the hills of Maryland was serving as cross-ties before the locomotive came on the scene. The first railroad out of Baltimore, aiming for the Ohio River, was operated by horsepower, and the short, cast-iron rails were nailed down on white oak timbers. Eighty years ago it came to the front as tie material, and it has held its place against all rivals. It serves other railroad purposes equally well. It makes the enormous bumping posts at track ends; beams in car frames which receive jerks and impacts; frame posts, spring blocks, pilot beams, log-car bunks, cattle stops, car seats, and the interior wood work of passenger coaches.

It is possible to extend much further the classes or groups of commodities in the manufacture of which white oak is used, but that would only accentuate the fact that the wood approaches universal use more nearly than any other of this country, or of any country. It is employed in dimensions large and small; ribbons for basket weavers, and columns for halls and balconies; runners and cross pieces for toy sleds, and beams for cold storage doors; wood for cheese boxes, pulleys in machine shops, water wheels, road scrapers, merry-go-



TIGHT COOPERAGE

White oak is the premier wood in this industry, and is used almost to the exclusion of all other woods as raw material in the manufacture of staves and heading for high grade barrels, kegs and casks and other containers of wines and liquors, for both foreign and domestic use.

rounds, saddle trees, whip handles, sucker rods for oil wells as a substitute for hickory, ten pines, caskets and coffins, bench screws, elevator cages, spring bars, water gates for mills; neck yokes for roguish horses and rolling hoops for playful children.

(Much of the information in this article was secured by courtesy of the United States Forest Service.)

#### FOREST KING FALLS

THE Nehalem, Oreg., forests have lost a king. A giant spruce tree that is estimated to be nearly 4,000 years old has fallen a victim to the havoc of a storm. This representative of the earliest of Oregon trees measured some 19 feet at the point where it was broken. Throngs continue to visit this fallen wonder of wonders, and not a few have attempted to count the numberless rings by which its age is computed by scientists.

At Watseco, Oreg., a huge cedar tree holds a place of honor among the attractions. It is 17 feet in diameter, and is said to be about 2,000 years old.

The Nehalem country claims some unequalled records for the age of Oregon native trees. The violence of the gales sweeping up into the God's Valley district have laid low many woodland lords.



# The Sequoia National Park

BY MARK DANIELS

*Ex-General Superintendent of National Parks*

THERE are few who have not suffered attacks of wanderlust. In some it takes a disguised form and calls for consultation to arrive at the proper diagnosis. In others that strange seasonal restlessness can be recognized at once, without the aid of so much as a thermometer, as the itching foot, as it is called out West. Whether the desire to roam the earth is prompted by an instinct inherited from our nomadic forbears or by those local conditions which so frequently make travel advisable, it is certain that once the desire is temporarily gratified the disease becomes permanent and can be cured only by amputation.

Of the numerous and varied types of attractions which lure the weary business man with waking dreams of travels in other climes, three seem to be possessed of a

charm of singular virulence—the sea, the desert and the mountains. Perhaps it is because in these three widely different fields we find that nature, in her sublime simplicity, leads us back with steady hand to that closer relation with the Creator which childhood's dreams are made of. Perhaps it is that in great expanse men's souls stretch out and the veil of human pettiness is sometimes lifted. Whatever may be the reason, it is certain that once a deeper draught of either of these three cups is taken, there ensues a thirst for more that knows no quenching.

About the sea I cannot speak with knowledge born of personal experience, but I have never known a deep-sea sailor who had breathed the breath of the ocean deep into his lungs who could put the longing for the sea entirely out of his heart. As for the desert and the



Photo by Mark Daniels.

LOOKING WEST FROM MT. WHITNEY

This view is from the point on the upper slopes of the great mountain known as The Chimney. Near Mt. Whitney are four great canyons, one of which is half a mile deeper than the canyon of the Colorado in Arizona, and many forests of the giant Sequoias.



AN UNNAMED LAKE

These sparkling gems are legion in number in the southern Sierras. Some are hidden in forest glades, others glisten like jewels in their platinum settings of perpetual snow; all are a delight to the traveler. This one, so well worthy of a name but as yet unchristened, is near Agnew Meadows, Sequoia National Park.

mountain tops, I can speak with the feeling of one who has been bitten by the bacillus, for I have roamed through ranges and deserts afoot, astride the trusty jackass, aboard the grumbling mule and clinging to the saddle horn of a bucking cayuse, and that longing for the desert's expanse and the crisp air of lofty peaks is always with me. Nor is my case unique, for every year sees some gray-haired retired miner whose suddenly acquired wealth necessitates his stealing stealthily from the route of fashionable places to shade his eyes for one more lingering look at the shimmering desert that yielded him her treasures. Each spring finds an ever-increasing throng turning toward the mountains for another sight of verdant forests and snow-clad peaks.

For those whose predilections are for mountain crags, forest glades and echoing canyons, there is perhaps no place more replete with such features than Sequoia Park and the surrounding territory. Situated at the southern end of the Sierra Nevada in California, the area covered by the National Park and contiguous national forests includes Mt. Whitney, the highest peak in the United States, four great canyons, one of which is one-half mile deeper than the canyon of the Colorado in Arizona, and

many forests of *Sequoia Gigantea* in one of which is the greatest and oldest tree on earth.

Roughly speaking, this area is fifty miles wide and sixty miles long as the crow flies. Traversing the northerly half and flowing in a westerly direction are the middle and the south forks of the King's River. The former stream is in one place seven thousand feet below the upper rim of its canyon, and while the walls are not vertical as in the Colorado, it flows through the deepest canyon in the world and is a most impressive sight. Separating the drainage area of the King's from the Kern is the King's-Kern Divide, a jagged range that lies to the south and generally parallels the south fork of the King's River. From the park line east this wonderful spur, together with the Sphinx Crest, forms an all but impassable barrier between the King's and Kern, and to the traveler its many spires beckon the enthusiast to essay its ascent for a peep at the world beyond. But the bleaching bones of a sturdy burro will testify to the futility of such an attempt, at least at the place where I endeavored to pass through. There are, of course, two or three passes which can be traversed on foot and which could be made safe for animals by a little judicious trail building.



THE KERN DOMES, KERN RIVER CANYON, CAL.

Overlooking the famous canyon these peaks are a notable feature of the wall which shuts in the almost level floor of the canyon. These walls are not so vertical nor so systematically shaped as those of the Yosemite but in places they rise to an altitude of over three thousand feet above the river.

Across the King's-Kern Divide about two miles west of its junction with the crest of the High Sierra is a trail that connects the King's River Canyon with the Kern River Canyon and crosses at Harrison Pass. It is possible to take animals over this pass, but hardly advisable. Construction work is now being performed on the trail over the pass and a safe and easy passage for animals is assured for next season.

The Kern River has its source in the almost countless number of small lakes and mountain tarns which nestle around the upper bases of the peaks which form the Kern-King's Divide and the main ridge of the Sierra Nevada from Junction Peak south. The Kern flows in an almost due south direction, practically at right angles with the direction of the South Fork of the King's. To the east of the great Kern Canyon the main ridge of the Sierra Nevada bars the passage to the famous Owens River valley and to the west the great Western Divide separates the Kern from the Kaweah. With the Sphinx Crest and King's-Kern Divide running in an easterly and westerly direction, the Great Western Divide and the main ridge of the High Sierra running parallel to one another in a northerly and southerly direction, each with its lofty peaks and serrated crest silhouetted against the

sparkling azure skies, the country is divided into three sections each of which is a riot of beauty and a wonderland well calculated to fascinate the camper and mountain climber and banish from his mind all thoughts of time.

To attempt to describe the entire area would at least indicate a monumental conceit on the part of even the greatest of writers. To attack the task of an adequate description of even a smaller section must, to those who have traversed this country, appear presumptuous; but at least I may indicate some of the beauties which may be encountered on a trip crossing the Great Western Divide, the Kern Canyon and the main range of the Sierra Nevada. Perhaps the most fortunate circumstance, in connection with this rugged and broken country, is the fact that there are certain trails which lead one along canyon floors, swinging around great bluffs and over high passes with astonishingly little danger.

The orthodox port of entry to this land of enchantment is the small town of Vasalia in Tulare County, California, where, amongst other attractions offered by the general locality, one may secure enchiladas, frijoles and Spanish chicken prepared and served in a manner that justifies the claim to a true Spanish origin. If the traveler is so fortunate as to dine upon one of these old Mexi-



can mysteries, the disagreeable elements which he may encounter in the automobile trip from Visalia to the Giant Forest in Sequoia National Park will be ameliorated by the pleasant recollection of his repast.

The road to the Giant Forest, after crossing the plain, strikes the Kaweah River and follows up the Little Valley and Canyon to the junction of the Middle and North Forks. There it crosses the River and follows the North Fork of the Kaweah, climbing gradually above it to the

Divide. There are few roads in the world which possess such an inspiring view as may be seen from Administration Point on the Park road.

From Administration Point on to the Giant Forest the view of the Middle Fork Canyon is secured only now and then. Most of the road passes through the Forest. The giant trees which are in the vicinity of the camp so far eclipse all conceptions of the marvelous that thoughts of the canyon view are banished.



A LIGHTNING ROD OF THE HIGH SIERRA

This is University Peak as seen from Kearsage Pass, near the Kings River Canyon, California. It lies to the north of Mt. Whitney and is called one of the lightning rods of the mountains. Its rock-ribbed summit and sides have been struck by lightning countless times without much apparent damage.

Park entrance. From the Park entrance the road is on a steady upward grade and swings around points of the south shoulder of the Ash Peaks to the Old Colony Mill where the first view of Moro Rock and the valley of the Middle Fork of the Kaweah bursts through the screen of trees in a breath-taking way that shocks their observation into alert attention. At this point the road is on the north rim of the Middle Fork Canyon and just beyond Old Colony Mill, at Administration Point, rises to about 3,500 feet above the stream which may be seen threading its way like quicksilver down the canyon. Straight ahead is Moro Rock with its domelike summit rising over 4,000 feet above the river below. In the background some twelve miles away is the crest of the Great Western

The Giant Forest, which constitutes the terminus of the wagon road, surrounds a camp, some studios, the post-office and the Park Ranger station. The peace and restfulness of this group of monarchs pervades the camp and constrains the small group of tourists to speak in humble and softer tones. I have never known anyone to enter this wonderful group en route to the back country who did not abandon thoughts of speedy passage to linger beneath the branches and amongst the towering shafts of these trees which were 3,000 years old when Christ was born. As a matter of fact there is sufficient beauty and glory within a radius of five miles from this camp to justify the stay of the most bored of tourists for several weeks.

In this district are the only groves of *Sequoia Gigantea* which are receding themselves to any marked extent, and there are in the Sequoia Park alone over one million trees of the species. They are not scattered throughout or evenly distributed as is so frequently the case of pine forests, but are spotted in groups and groves in certain locations. To the northwest of the Giant Forest, a distance of about eight miles, is the Muir Grove. About three miles from the camp is another group of big trees

It is amusing to see the tenderfoot tourist attempt to photograph a Giant Sequoia. There is nothing sufficiently approximating these trees in size within reasonable distance. As a result, the scale is almost lost and until one has spent some time in their midst the true proportions of them are not realized. The tourist, to whom their presence is strange, will frequently attempt to photograph them from a distance of 100 feet or so, but he begins to step backwards gingerly, glancing from time to time at



*Photo by Mark Daniels.*

FRANKLIN LAKE

Florence Peak is in the background and the author photographed his friends as they were admiring the wonderful setting of the beautiful mountain lake. This is on the Great Western Divide near Mt. Whitney.

near Halstead Meadows, and to the east, a distance of about seventeen miles by trail, and just outside the Park, is a grove of big trees at Redwood Meadows. Scattered along the trail from the Giant Forest to the Redwood Meadows in several places may be found small groves and isolated specimens. The sensation with which one confronts a Giant Sequoia defies description, though many have essayed the task. There is that subconscious feeling of standing in the presence of the oldest living thing on earth whose centuries of life have gathered about it a mysterious force that may be felt by all observers. But think of traveling through a forest of such trees! Think of passing from their sombre shadows into the sparkling sunlight and back again beneath the shaggy branches of another grove!

his finder, until he comes to a realization of the fact that if he can place enough distance between his lense and the tree to enable him to take in the trunk up to the first branches without intervening obstruction, he will be most fortunate. At first sight one is inclined to assume the attitude of the farmer who after a prolonged gaze at a hippopotamus ejaculated, "Hell, there ain't no such animal." Perhaps the only ones who have had the tremendousness of these trees deeply impressed upon them are those who have been confronted with the task of hewing them down. As an illustration of their size: The General Sherman, which is the largest tree, is 279 feet high, 36½ feet in diameter and is estimated to contain 1,000,000 feet of lumber board measure. When it is considered that this is equiva-

lent to the amount of timber that is cut from about forty acres of average Minnesota timberland, some conception, at least, of the cubic contents of this tree can be secured.

If an early start is made by saddle animal and pack train, the distance from Giant Forest to Redwood Meadows may be comfortably traversed in one day, and along the route an ever-changing view of the great canyon of the Middle Fork of the Kaweah presents itself, first on one hand and then the other, as the trail swings around points down into small ravines and up over projected plateaus.

At Redwood Meadow there is a grove of Sequoias which would seem to have been placed for the special delectation of the night camper. They encircle an open space in which has been constructed a crude table and fireplace so situated that one may still make his bed within the charmed circle without being too close to the kitchen. The energetic attentions of the forest rangers (for this is outside the Park and in the National Forest) keeps removed to a reasonable distance the earmarks of former occupants, which, in spite of the requests of posted signs, are ever evident in the form of empty cans which mark the wake of the tenderfoot. To lie beneath the open sky in this enchanted circle and gaze up at the stars, which seem to be seen as from the

bottom of a well, is a privilege that is granted only to those who eschew the beaten paths of tourist travel, but it is one the attainment of which justifies great sacrifice.

From Redwood Meadow there are two routes which may be followed to reach the Great Canyon of the Kern; one trail follows Cliff Creek over the Great Western Divide by Columbine Lake into Lost Canyon, and thence down the Big Arroyo over the end of the Chagoopa Plateau and down the canyon walls to the Kern River;

the other continues along Deer Creek over Timber Gap to Mineral King, from which two other routes are available, one crossing Farewell Gap and leading to Soda Spring on the Kern River, the other crossing the great western divide near Franklin Lake over Franklin Pass just north of Florence Peak and down the Rattlesnake to the Kern River. Perhaps the most interesting route of any is the one which zigzags back and forth, crossing the great western divide at Coyote Pass, entering the lower end of the Kern Canyon at Soda Springs. This route develops eighteen miles of trail on the floor of the Kern Canyon and takes in practically the entire length of that portion which is confined between precipitous walls. It is not, however, so picturesque as the route over Franklin Pass and cuts out the fascinating trail down Rattlesnake Creek,



THE GRAND SENTINEL

This impressive peak is aptly named. It watches over the river that washes its base in moods varying from the placid stream of autumn to the raging torrent of early spring.



although it does avoid the steep and difficult trail which drops from the rim of the canyon to the floor at the junction of Rattlesnake Creek with the Kern.

On the Franklin Pass Trail the summit of the great western divide is attained at the disputed elevation of 11,300 feet. From this pass the first view of the great range of the higher Sierra is secured. It is stunning, breath taking. The great peaks from Langley to Barnard, including Le Conte, Muir, Whitney and Russell, all peaks 14,000 feet or over, stand out in startling array against the eastern sky. The range that is stretched before you is really the great western divide, but these mountains were first climbed from the west and the range of peaks, of which Florence Peak just to the south of Franklin Pass is one, was supposed to have been the great western divide and was so named. It was not until some time after that the higher crest of the Sierra Nevada was discovered, probably just in such a manner as it is discovered each year by those upon whose vision it bursts for the first time from Franklin and similar passes of the western ridge. It is a bit confusing to find the lower ridge named the great western divide, while the main crest of the Sierra Nevada, with its towering peaks, is the true divide.

It is difficult to leave Franklin Pass with the vast panorama of mountain peaks and canyons stretching on all sides, but the trail down Rattlesnake Canyon traverses a country so new and different from that over which the trail to this point has led that the regrets are of short duration. To me Rattlesnake Canyon and the Siberian outposts, about twenty miles further along the trail, are

the two most fascinating features of this district. Rattlesnake Creek lies between great walls of granite which, about half way down the creek, are over 2,000 feet in height and almost vertical. The bottom of the canyon, however, is for the most part wide and comparatively level, carpeted here and there with meadows which are threaded by the sparkling waters of the creek. Perhaps it

is the contrast between the moss and grass covered floor and the barren rock and disintegrated granite of the pass which adds such charm to that portion of the trail which leads through Rattlesnake Canyon, but in addition to this, there is an undeniable and a very distinctive character to the formation of the canyon walls, which makes this bit of trail stand out in one's memory. There are more colors in the granite of the walls and they are also sculptured in such a way as to cast interesting shadows and carry spots of sunlight. The charm of the canyon casts its spell over even the dumb, as is evidenced by the profusion of those reptiles that have given the creek its name. Exercising alertness for the wily snake adds a soupçon of interest, as it were.



*Photo by Mark Daniels.*

#### THE KERN RIVER

This stream rises in the hundreds of small lakes around the upper bases of the peaks which form the Kern-Kings Divide and the main ridge of the Sierra Nevada. It flows almost due south. This view of it was taken near Funston Meadow.

The descent from the upper rim of the Kern Canyon to the floor is the most tedious portion of this wonderful trail. The zigzags back and forth seem countless in number and the trail endless. At each turn one expects to find the river within a stone's throw, but after fifteen or twenty have been made, the river is still as far as ever. The drop is about 1,800 feet, at every 100 of which the patient mule cranes his neck astern and reproaches humanity with a pained expression and pleading eye. The trail finally emerges, however, upon the broad grass-



*Photo by Mark Daniels.*

#### THE KINGS-KERN DIVIDE

This is the view west from Kearsage Pass and looking over into Bullfrog Lake. From this picture some idea of the lightning-torn peaks of the Great Western Divide may be obtained.

covered floor of the canyon where flows a real river abounding in jumping trout.

From this point to the head of the Kern Canyon is twelve miles and there are good camping places along the entire distance. The floor of the canyon is comparatively level, though the trail here and there climbs up over piles of talus, as if to give a clearer view up and down the river. The walls of the canyon are not so vertical as those of the Yosemite nor are they so symmetrically shaped, but in places they rise to an altitude of 3,000 feet or more above the river. Riding through this canyon is almost like a morning's ride in a city park, with everything visible magnified many times. The trail crosses the river at Funston Camp just above the junction of the Big Arroyo and the Kern and the crossing must be negotiated by fording. From this point on the variety of trees is one of the fascinations. Cedar, pine, quaking aspen, and that most beautiful of trees, the gnarled and picturesque juniper, are grouped and blended by the Master-hand with a skill that defies duplication and drives the chill of discouragement deep into the soul of the landscape gardener. The canyon is alive with bird life. On one trip I saw Nuttall woodpeckers, red-breasted sap suckers, California woodpeckers, the Cassin King bird, fly catchers, jays, crioles, wood warblers, and a wonderful western tanager, flashing through the filtering sunlight arrayed in his scarlet, black and gold plumage.



*Photo by Mark Daniels.*

#### ON WHITNEY'S PEAK

Stephen T. Mather, third assistant to Secretary of the Interior Lane, who has charge of the National Parks, and Emerson Hough, the well-known writer, on top of Mt. Whitney.



THE HIGHEST PEAK IN THE UNITED STATES

This is Mt. Whitney in southern California, and for all its distinction as the highest mountain in this country it is most easy of ascent and from this point of view not at all impressive. From its summit may be seen the town of Tom Pine, two miles below, and the inclination is strong to step carefully in fear of dislodging some stone that might crush the tiny hamlet.

The ascent up the canyon is commenced at Junction Meadow at an elevation of 8,000 feet. From there the trail climbs steadily to an elevation of approximately 11,000 and then drops to 10,300 at Crab Tree Meadow. This is the camp from which most trips are made, from the western side, to the summit of Mt. Whitney. Despite the fact that Mt. Whitney is the highest peak in the United States, the ascent is in no way difficult except for those to whom the presence of pure ozone in the lowermost cavities of the lungs is a strange and terrifying experience. There is a stretch of about 500 feet called the Chimney which presents a few passages here and there which at first seem a trifle difficult to negotiate, but they become simple as they are approached. The summit is pervaded with a spirit of aloofness from the lower world which is most impressive and this, together with the view of Lone Pine over two miles below and less

than twelve miles to the east, seems to lift the peak to an altitude that more closely approximates the heavens than many of those who climb had ever hoped to attain. The east shoulder of the mountain is a vertical precipice of 1,500 feet, at the base of which lies a small lake which is partly covered with snow and ice. Desolation and lightning-pierced piles of granite boulders surround the peak on every side, and if the ever-imminent storm does not suggest the advisability of immediate departure, the cold and the sensation of approaching tragedy are bound to do so. Strangely enough the return trip is more difficult than the ascent and sighs of relief are a familiar sound to the stunted pines of Crab Tree Meadow.

The next fifteen miles of the trail that leads to Whitney Meadows is a succession of weird scenery and startling panoramas. The trail passes over the sand flat to the east of Mt. Guyot and around the southern shoulder of the Siberian Outpost to the home of the golden trout.

Scenery, like people, is of interest in proportion to the degree of individuality which it expresses. A rolling hill of nondescript character will no more interest a traveler than will a person with nondescript features and mediocre mind. There is a strange individuality to the scenery in the vicinity of the Siberian Outpost which is all but

intangible. On either side of the trail are fields of dwarf lupins of that pale blue which suggests the watery eye of the "ancient mariner." In the distance not many miles are forests of spectral trees silhouetted against the neutral gray of granite peaks. The entire scene is pregnant with the spirit of mystery and desolation. In sharp contrast to it is the babbling brook that tumbles down over the granite boulders that have resisted the disintegrating forces.

Whitney Meadows are threaded by Golden Trout Creek, which is the home of the famous golden trout and the only place in the world where this particular variety of fly-loving, golden-bellied trout are to be found. The meadow on either side of the creek is free of any growth, save grass, for hundreds of yards, and if your eye is sharp enough and your hand sufficiently skilled, you may cast a fly into the corner of the pool forty or





Photo by Mark Daniels.

#### THE SUPPLY TRAIN

The cook and the pack mules and horses descending from Franklin Pass on the Great Western Divide at the time the author with a party of friends visited that section.

fifty feet away and see the wily trout jump from the shadow of the bank. It is like fishing in a gold-fish bowl and catching real gold-fish, and if you are possessed of the sportsman instinct, your constant inclination will be to toss the beauties back into the stream.



Photo by Mark Daniels.

#### ON MT. WHITNEY'S SUMMIT

E. O. McCormick, a vice-president of the Southern Pacific R. R., one of a party which last summer spent some time in the park, standing at the rock monument which marks the top of the highest peak in the United States.

From Whitney Meadows the trail leads over the summit of the Sierra Nevada through Cottonwood Camp, by Horseshoe Meadow and down, down, down to Lone Pine. On every side are snow-clad peaks, mountain streams and verdant forests, until the true eastern slope is reached. On the north shoulder of Wonoga Peak the first view of Owen's Lake and the desert ushers in another phase of nature. From here on, arid desolation is the keynote. Through the haze, the great salt basin of Owen's Lake appears like a mirage a mile and a half below. The barren slopes of the Panamint Range which hide Death Valley from view appear as mammoth mounds outposting the way to the Funeral Range beyond.

At Lone Pine the stage runs to the railroad station which means farewell to this land of dreams. Each halting step on the downward trail spells another tug at the heart strings to return for one more night up near the stars and in the life-giving air intended for the lungs of man whom God made in his own image.

#### FIGHTING MOTHS WITH PARASITES

OVER 12,000,000 specimens of two parasites which prey on the gipsy moth and brown-tail moth were released in 201 towns in Maine, New Hampshire, Massachusetts and Rhode Island during the fall of 1914 and spring of 1915, according to the annual report of the Bureau of Entomology, United States Department of Agriculture. As a result of the successful establishment of colonies of these and other parasites which feed on the gipsy and brown-tail moths, marked progress is being made in reducing these pests. Effective cooperation is being afforded by the States, which carry on as much work as possible within the infested areas, thus allowing the Federal authorities to carry on field work along the outer border of infestation, so as to retard the gipsy moth's spread.

As a result of scouting work carried on by the entomologists in 223 towns in New England, the gipsy moth was found in 4 towns in Maine, 23 in New Hampshire, 3 in Vermont, 10 in Massachusetts, and 10 in Connecticut, making a total of 50 towns where the insect had not been previously reported. This scouting consists in an examination of all roadsides, residential sections, orchards and woodlands. Where colonies are found the egg clusters are treated with creosote and the trees are banded with three tanglefoot and sprayed with arsenate of lead.

The spread of the brown-tail moth during the past year has been inconsiderable, the indications being that this pest has not infested any territory other than that already reported. In cooperation with the United States Lighthouse Service, the work of collecting moths at night along the coast of Connecticut and Long Island has been continued.

Other activities of the Bureau in relation to the gipsy moth include the inspection of forest products, nursery stock, and stone and quarry products shipped from gipsy-moth territory, as well as extended investigations along other lines.

# National Parks as an Asset<sup>1</sup>

By HON. FRANKLIN K. LANE, *Secretary of the Interior.*

THE United States furnishes playgrounds to the people of this country which are, we may modestly state, without any rivals in the world. Just as the cities are seeing the wisdom and the necessity of open spaces for the children, so, with a very large view, the nation has been saving from its domain the rarest places of grandeur and beauty for the enjoyment of the world.

And this fact has been discovered by many only this year. Having an incentive in the expositions on the Pacific coast, and Europe being closed, thousands have for the first time crossed the continent and seen one or more of the national parks. That such mountains and glaciers, lakes and canyons, forests and waterfalls were to be found in this country was a revelation to many, who had heard but had not believed. It would appear from the experience of this year that the real awakening as to the value of these parks has at last been realized, and that those who have hitherto found themselves enticed by the beauty of the Alps and the Rhine and the soft loveliness of the valleys of France, may find equal if not more stimulating satisfaction in the mountains, rivers, and valleys which this Government has set apart for them and for all others.

It may reconcile those who think that money expended upon such luxuries is wasted—if any such there are—to be told that the sober-minded traffic men of the railroads estimate that this year more than a hundred million dollars usually spent in European travel was divided among the railroads, hotels, and their supporting enterprises in this country.

During the year a new national park of distinction and unusual accessibility has come into existence. It crosses the Rockies in Colorado at a point of supreme magnificence; hence its title, the Rocky Mountain

National Park. Through it, from north to south, winds the Continental Divide—the Snowy Range in name and fact. Two hundred lakes grace this rocky paradise, and bear and bighorn inhabit its fastnesses. It has an area of 350 square miles and lies only 70 miles from Denver. Many hotels lie at the feet of these mountains and three railroads skirt their sides.

This is Colorado's second national park, the other being Mesa Verde, where this department, with the assistance of Dr. Jesse Walter Fewkes, of the Smithsonian Institution, has uncovered during the last summer prehistoric ruins of unprecedented scientific interest.

Oregon has but recently completed a great highway along the Columbia River. This should be connected by road with Mount Hood and a portion of the present forest reserve converted into a park. The limits of Sequoia Park, in California, the home of the great redwoods, should be so extended as to include the Kern River Canyon, a most practicable project today; but tomorrow may be too late, because of the lumber interests. The Grand Canyon is not yet part of the park system, al-

though as part of a national forest it comes under the control of the Department of Agriculture.

There is no reason why this nation should not make its public health and scenic domain as available to all its citizens as Switzerland and Italy make theirs. The aim is to open them thoroughly by road and trail and give access and accommodation to every degree of income. In this belief an effort has been made this year as never before to outfit the parks with new hotels which should make the visitor desire to linger rather than hasten on his journey. One hotel was built on Lake McDermott, in Glacier Park, one is to be built immediately on the shoulder of Mount Ranier, in Paradise Valley, another in the valley of the Yosemite, with an annex high over-



HON. FRANKLIN K. LANE  
*Secretary of the Interior.*

<sup>1</sup>From Secretary Lane's annual report to Congress.



WHITNEY DOME

The dome formation of the southern Sierra does not take the perfect form found in the Yosemite region. This dome is on the rim of the King River Canyon, California.

head on Glacier Point, while more modest chalets are to be dotted about in the obscurer spots to make accessible the rarer beauties of the inner Yosemite. For with the new Tioga road, which, through the generosity of Mr. Stephen T. Mather and a few others, the Government has acquired, there is to be revealed a new Yosemite, which only John Muir and others of similar bent have seen. This is a Yosemite far different from the quiet incomparable valley. It is a land of forests, snow, and glaciers. From Mount Lyell one looks, as from an island, upon a tumbled sea of snowy peaks. Its lakes many of which have never been fished, are alive with

trout. And through it foams the Tuolumne River which in a mile drops a mile, a water spectacle destined to world celebrity. Meeting obstructions in its slanting rush, the water now and then rises nearly perpendicularly, forming upright foaming arcs sometimes 50 feet in height. These "water wheels," a dozen or more in number, will be accessible next summer by a trail to be built when the snow melts in June.

While as the years have passed we have been modestly developing the superb scenic possibilities of the Yellowstone, nature has made of it the largest and most populous game preserve in the Western Hemisphere. Its great size, altitude, its vast wilderness, its plentiful waters, its favorable conformation of rugged mountain and sheltered valley, and the nearly perfect protection afforded by the policy and the scientific care of the Government have made this park, since its inauguration in 1872, the natural and inevitable center of game conservation for this nation. There is something of significance in this. It is the destiny of the national parks, if wisely controlled, to become the public laboratories of nature study for the nation. And from them specimens may be distributed to the city and State preserves, as is now being done with the elk of the Yellowstone which are too abundant, and may be later with the antelope.

If Congress will but make the funds available for the construction of roads over which automobiles may travel with safety (for all the parks are now open to motors) and for trails to hunt out the hidden places of beauty and dignity, we may expect that year by year these parks will become a more precious possession of the people, holding them to the further discovery of America and making them still prouder of its resources, esthetic as well as material.

#### WOOD PRESERVERS' CONVENTION

THE Twelfth Annual Convention of the American Wood Preservers' Association will be held at Hotel Sherman, Chicago, January 18, 19 and 20, 1916. Delegates from the United States and Canada will attend and it is expected many outsiders will be drawn to the Convention by reason of their interest in the conservation of our forest resources and the economic utilization of wood.



# The Forests of Alaska

BY HENRY S. GRAVES

*Chief Forester, U. S. Forest Service*

THE American people are only just coming to realize that large portions of Alaska are habitable and that, through the development of the valuable resources, there will be an extensive permanent population, destined to make the territory an important part of our nation. The average visitor today goes as far north as Skagway. He sees only a small corner of Alaska, though it is a part abounding in interest and rich in opportunities for development. Perhaps most visitors are interested chiefly in the unmatched scenery, the rugged mountains of the mainland and of the larger islands, the narrow, sinuous passages between the islands and in the deep inlets, the snowfields, glaciers, and waterfalls, and the Indian villages with their emblematic and

mortuary totem poles. The tourist is able to get a glimpse of a few of the larger mines, and visits some of the numerous canneries and fish-salting establishments. But a real appreciation of the actual conditions and the problems of development can be obtained only by taking time to go about among the various islands of the Archipelago, stopping off at different points to see the resources themselves and the beginnings that are being made for their development—the logging operations, the mines, the quarries, the settlers' homesteads, and the fishing enterprises.

Such a visit reveals the fact that one of the most important of the resources of southeastern Alaska is the timber. The high range of the mainland and the back-



WESTERN RED CEDAR IN ALASKA

The forests on the southern coast of Alaska represent an extension of the coast belt of Oregon, Washington, and British Columbia. There are many of the same species, with trees of large size and heavy yield, and there are similar characteristics of forest life. In southeastern Alaska the western red cedar grows in abundance, mingling with the spruce, hemlock, and the Alaska yellow cedar.



HEAVY TIMBER IN THE TONGASS NATIONAL FOREST

The heaviest stands of timber in the Tongass National Forest occur on the flats, benches, and protected slopes. The trees reach, however, an astonishingly good development on beds of boulders and stones where the soil is meager. On the better and deeper soils, the Sitka spruce often occurs to the exclusion of other species and in such locations very largely predominates in the stand. Chief Forester Graves in the foreground.

bone of the larger islands rise above timberline, but many of the islands and peninsulas of the mainland have a relatively low elevation and are wooded to the top. But the forests, as viewed from the water, give little idea of their real character. Seen from a distance, they may appear unimpressive. If, however, one goes back into the woods, landing, for example, at the head of one of the innumerable bays, he finds himself in a great timber forest, with the characteristics and many of the same species found in the forests of the coast of Washington. It is in reality in the same forest region as western Washington and British Columbia, for southeastern Alaska, under the influence of favorable ocean currents, is characterized by a very equable climate, a relatively long growing season, and a large amount of moisture. These are the same climatic conditions that create the great forests of the northwest coast of the States. There is on the coast of Alaska, as farther south, the same response of vegetation to climate and a forest composed

of trees of large size and heavy yield, and having the same general form, character of reproduction and of life development.

We may speak of the northern coast forests of the States as representing the center of best development of the prevailing forest type, and the Alaskan coast forests as its northern extension. As one moves from the center or optimum region of development of a forest type, the number of species drops off and the trees do not reach as great a size and yield. This is true of Alaska. One conspicuous species of the Washington and Oregon coast is absent, the Douglas fir, as well as a number of the less important species. The forest is made up chiefly of Sitka spruce, western hemlock, and red and yellow cedar, with a number of other species so scattered or so inferior as to be of no economic importance. The trees are also smaller, for in Alaska the spruce reaches a maximum diameter of about 8 feet and a height of over 200 feet, while in the States one finds spruce more than 12



SITKA SPRUCE IN THE TONGASS NATIONAL FOREST

The most important species in Alaska is the Sitka spruce. Single trees reach a diameter of over seven feet and a height of 200 feet. A single log brought to one of the local mills was 154 feet long and scaled 18,000 board feet. Many parts of the forest run from fifty to seventy-five thousand feet per acre, limited areas carry one hundred thousand feet per acre.

feet in diameter. But this comparison indicates an extraordinary development of the Washington forests rather than a small yield in Alaska.

The coast belt extends from Dixon's entrance west to Kenai Peninsula, a distance of about 1,000 miles, inter-

rupted at several points where the mountains extending to the sea are so rugged and rocky or have such a cover of ice and snow that tree vegetation is prohibited. Just as the Alaskan coast forests have a smaller development than the coast forests further south in the States, so the



northwestern portion of the belt within Alaska has a smaller development than the southeastern extremity. The bulk of the timbered area of the south coast of Alaska is included in two National Forests, the Tongass Forest, comprising the principal timber areas southeast of Cape St. Elias, while the balance is incorporated in the Chugach Forest.

The fact that there are only two National Forests in Alaska and these confined to the south coast has given

tonwoods, and is an extension westward of the north Canadian forest.

#### THE TONGASS FOREST

The Tongass National Forest, comprising an area of about fifteen million acres, contains one of the most extensive bodies of timber remaining in the United States. Its great extent, its enormous volume of useful products, and its accessibility give to this Forest far



AN INDIAN LOGGING CAMP ON THE TONGASS NATIONAL FOREST

The National Forest timber sales furnish labor to native tribes and will be an increasing factor in forwarding the prosperity of the Indians. Formerly the cutting of timber was confined for the most part to material near the shore which could be "hand-logged," that is, cut and put into the water wholly by hand labor. Modern logging appliances are now being introduced and the work in the lumber woods becoming more highly organized.

rise to a popular impression that there is little or no timber elsewhere in the Territory. It is true that the heaviest timber is within the area already described. But it is also a fact that a large part of interior Alaska was originally covered with a natural forest growth. Taking the Territory as a whole, about 40 per cent of the total area was originally wooded; and that is almost as great a percentage as the original forest area of the States. The forests of the interior of Alaska are, however, of a totally different type from those on the south coast—different species, smaller trees, smaller yield; a forest which will not play much, if any, part in the supply of the general lumber markets of the country, but which is of enormous importance for building up and maintaining local industries and domestic needs. It is a forest chiefly composed of white spruce, white birch, and cot-

more than local importance. It will be a great factor in the industrial upbuilding of Alaska. As a reservoir of forest supplies it has an importance that makes its problems of national interest.

The favorable climatic conditions have produced a forest of large yield of valuable timber. Not uncommonly individual spruce trees contain over 15,000 feet of lumber. During the last year a single log was brought into a mill in Ketchikan that scaled 18,000 feet. It was 154 feet long and 41 inches in diameter at the top end. Many stands yield 50,000 board feet per acre, and restricted areas run as high as 100,000 feet per acre. There are now on the Tongass Forest fully eight to ten million acres carrying merchantable timber which will average, over the entire area, not less than 7,000 to 9,000 feet at a conservative estimate. This does not

include several million acres scattered throughout the Forest whose timber cannot at the present time be considered of merchantable character. A total of from 60 to 70 billion feet of timber of useful sizes and quality is a conservative estimate.

The timber constitutes one of the greatest natural resources of southeast Alaska. There is not only an abundant supply for local use, but there are exceptional opportunities for the development of wood using industries for export from Alaska. The timber is of good quality and of heavy yield, and it is very accessible, easily logged, and close to water transportation. On the Tongass National Forest there are over 12,000 miles of shore line. The timber is close to the water and can be easily logged, with a small amount of investment required for improvements. There are many undeveloped water powers close at hand and available for use in running a sawmill or pulp mill. Under right handling, that provides for the perpetuation of the forest, not less than five or six hundred million feet could be taken each year from the Tongass Forest without reducing the total stock, as the new growth would equal the amount cut.

The heavy rainfall which occurs on the greater portion of the Tongass National Forest prevents, during normal seasons, serious danger from fire. This heavy rainfall, however, occurs chiefly on the islands; it falls off on the deep indentations and inlets and up the rivers of the

main land. Conspicuous examples of this are the Stikine River and Lynn Canal. In these sections forest fires have already done a large amount of damage, and seasons of great hazard are frequent. Dry seasons, however, also occur on the other portions of the Tongass National Forest, and there are many places which show damage from former forest fires. The season of 1915 was one of the driest known for many years. The drought was so great as to embarrass many communities and industrial plants, whose sources of water was dried up or greatly reduced. The ground cover became dry and inflammable, not only in openings and on cut-over lands, but in a great many places in the deep forest, where ordinarily there is enough moisture in the moss and humus to prevent fires from running. Extensive areas in the Tongass National Forest were during the past season in an inflammable condition.

#### THE CHUGACH FOREST

The coast forests to the westward of Cape St. Elias are comprised in the Chugach National Forest. There are included the timbered areas on a strip of irregular and deeply indented coast line skirting the Chugach mountain range and its southern spurs, the islands in Prince William Sound, Afognak Island, and a portion of Kenai Peninsula. The Chugach Forest comprises a total land area of 5,368,044 acres.



A TYPICAL LAKE VIEW ON THE TONGASS NATIONAL FOREST

One of the characteristics of the Tongass National Forest is that a great deal of the timber is very accessible, close to water transportation, and easily logged. There are many undeveloped water powers close at hand and available for use in operating a sawmill or a pulp mill.



A TYPICAL STAND OF BIRCH IN THE INTERIOR OF ALASKA

The timber in the interior of Alaska is not large and consequently will not be of importance from the standpoint of the general lumber industry. These forests are, however, of great value locally, for the presence of readily available timber is indispensable for the settler, for the miner, for road building and other pioneer work of development. It is of great importance for the Government to put a stop to the present great destruction of these forests by fire.

The region falls within the same general climatic zone as southeast Alaska. A heavy and well-distributed rainfall and a fairly long growing season cause a forest of excellent yield wherever the soil is suitable. The Chugach Forest unit extends, however, at its northwestern limit into the dry zone and includes a large area of timber of the interior type. Approximately 80 per cent of the whole area is of the coast type, the remaining 20 per cent of the interior type.

The conditions for forest growth are somewhat less favorable than in southeast Alaska. The chief cause of the difference is the more rugged topography. A larger proportion of the area is on the mainland, and the islands are bolder and have a more rugged topography than the average on the Tongass. In consequence, the forest often forms a strip along the coast of not over a half mile to two miles in depth. Again the forest is at a higher latitude which, combined with the local effect of the numerous ice fields and glaciers, gives somewhat less favorable conditions of growth.

The coast type of forest on the Chugach is composed almost wholly of Sitka spruce and hemlock. A little yellow cedar has been found, but it is very localized and not in sufficient quantities to be of any economic importance. Cottonwood also occurs in the coast type, but it is of but little commercial importance. Spruce on the Chugach Forest reaches a height of over 125 feet and a diameter of 6 feet. The average run of merchantable spruce is from two to three feet in diameter and 80 to 110 feet in height. The hemlock averages less in size than the spruce. In one sale on Montague Island there were cut two million feet on 100 acres, in addition to 35,000 linear feet of piling and a large quantity of material used for cordwood. I have examined a number of stands, selected at random, which carried 20 to 25 thousand feet of lumber, with individual spruce trees averaging from 1200 to 2500 board-feet each.

The hemlock on the Chugach is in general less sound than that on the Tongass. Not uncommonly hemlock growing on unfavorable soil is very unsound, the major-



ity of trees showing defect. Here and there are found areas of very poor drainage where peat has accumulated and a muskeg is formed on which the trees are scattered or absent entirely, and such timber as occurs is short and scrubby. On the other hand, there is an immense amount of excellent hemlock, sound and of high usefulness for structural material.

The external appearance of the coast forests of the Chugach is very deceptive. Occurring in many places as a relatively narrow belt, backed by high rugged mountains, the forests are overshadowed by the more conspicuous bare ridges, peaks and snow fields above timber line. The actual area of timber is under such circumstances not appreciated by the casual observer. The

trees on the edge of any forest have long crowns and are shorter than those within the stand. The scrubby, unsound hemlock on the rocky points and along the shore at the edge of the forest, the scattered dead trees that stand out conspicuously as seen against a slope, the existence of certain areas with pure hemlock and that having a large degree of defect, and the scattered areas of muskeg give an impression of an unhealthy condition that is misleading. No one, even an expert, can judge the character, condition and yield of a forest by looking at the mass of crowns from a distance. I have personally examined numerous stands which had precisely the aspect I have described, and found within the stand excellent spruce and a large amount of sound hemlock.



SECOND-GROWTH STAND OF SITKA SPRUCE AND HEMLOCK

Sitka spruce reproduces itself readily and grows rapidly. Many old windfalls have come up to a dense growth of spruce and hemlock. The forest shown in this view will soon yield piling. The trees have already reached a size specially suited to manufacture of wood pulp.

At the west end of the Chugach Forest there is a marked change in the climatic conditions. Whereas the rainfall on the Prince William Sound is from 75 to over 100 inches, it is less than 30 inches at the northwestern edge of the Forest. The high mountain ranges separate the Forest into two climatic regions, and there are correspondingly two distinct forest regions. The forest on the west end of the Chugach is of the interior type. This portion of the Forest is subjected to a great hazard from fire. During the past season the Forest officers were kept busy for nearly three months fighting fire. It was only through the work of these men that a large body of the best timber in that section was saved.

At the present time the largest single demand on the Forest is for piling and ties for the Government railroad. A permit has already been issued by the Forest Service to the Alaska Engineering Commission for 85 million feet for piling, ties and other purposes, on areas readily accessible to the railroad right of way. Aside from this special requirement for timber, there are used locally every year considerable amounts of timber for lumber, for piling in construction and maintenance of docks at towns, mines, and canneries, for mine timbers, and for various other miscellaneous uses.

Many persons have undertaken to depreciate the value and usefulness of the Chugach timber. It has recently



A RECENTLY BURNED FOREST IN THE INTERIOR OF ALASKA

The interior forests of Alaska are composed chiefly of white spruce, white birch and cottonwood. This view shows a typical spruce stand. On account of the relatively low rainfall these forests are subject to great fire hazard. There is no system of protection, and the aggregate destruction by fire during the past fifteen or twenty years has been enormous. The past season was an unusually dry one, and it is estimated that several million acres at least of these forests were burned over.

The total volume of timber on the Chugach National Forest is estimated as approximately 6 to 8 billion feet. This includes the timber of merchantable size and character, which is suitable for lumber, piling, ties, and pulp material. It excludes the unsound, straggling trees whose use for any purpose is doubtful.

The Chugach Forest is important, first as a source of forest products to meet local needs in the development of the region in which the Forest is located. It will have an increasing importance in furnishing certain classes of construction material in other parts of Alaska, and it is quite probable that there will be a demand later on for pulp material.

been argued that the shipping of lumber from Seattle and Tacoma to Valdez and other points within and near the Chugach Forest is conclusive proof that the local timber is of no public importance, is of little or no commercial value, and that the public control over it should at once be abandoned and the land opened to private acquisition.

The shipping into Alaska of lumber products from the outside does not prove in the slightest degree that the Alaskan timber is unfit to meet the requirements of local use, either in quality or amount. It indicates that the present economic conditions have not yet justified the development of a manufacturing industry that can com-



DESTRUCTION BY FIRE IN THE TONGASS NATIONAL FOREST

Portions of the Tongass National Forest have such a good distribution of rainfall during the summer that in ordinary seasons there is relatively little danger from fire. Those portions of the forest, however, on the coast, particularly at the head of the long inlets, have a much smaller rainfall and are exposed to a serious fire hazard. Occasionally, as during the past season, other portions of the forest become dry and over extensive areas are inflammable, requiring effective patrol to prevent serious damage.

pete with the outside material. At the present time also there is a great depression in fir on the coast, due to overstocking the market, and lumber is being sold at very low prices. Labor costs are much higher in Alaska than in the States, an item that in many cases enables coast mills under present conditions to compete in the north. But very important also is the fact that the lumber industry has not yet been developed in the west Alaskan forests on a scale to enable competition with the great mills to the south. The increased demands for forest products will bring a development of manufacturing plants to supply it; the adjustment of economic conditions in Alaska will bring the cost of labor nearer to that in the States. The recovery of the lumber markets of the States will prohibit selling prime lumber at sacrifice prices. Transportation facilities will be developed so that lumber can be shipped short distances at reasonable rates. Then the local forest material that is equally suitable with outside lumber for the industrial needs of the region will be used instead of imported material. This process will take place both on the Tongass and on the Chugach Forest, for the resources are of sufficient quantity and of the required quality.

#### FORESTS OF THE INTERIOR

The interior of Alaska has climatic conditions very different from the southern coast, and a correspondingly very different character of forest growth. A short growing season of great intensity, a light rainfall, and a cold soil are factors that restrict the species to a few of the hardiest kinds, and produce a forest of slow growth and light yield. The dominant species are white spruce, white

birch and cottonwood. The spruce grows heaviest on the flat lands, where it is often in pure stands over considerable areas or is mixed with cottonwood or birch. On the hill slopes the birch predominates, and frequently forms pure stands. In the swamps the white spruce is often replaced by black spruce, growing alone or with willows, and in places having a mixture of tamarack. Aspen and willows constitute a minor growth, coming upon newly formed river bars or on burned areas.

The largest and most valuable tree is the white spruce. Its average size is from 6 to 10 inches, its maximum seldom over 18 inches in diameter. Sometimes the spruce reaches a height of 90 to 100 feet, more often it is from 50 to 70 feet high. Cottonwood reaches similar dimensions, but birch is smaller by some 20 to 30 per cent. As is evident from the size of the oldest trees, the growth is exceedingly slow, due to the cold soil and short growing season. The timber is often knotty and the lumber, as compared to that produced in the States, is of inferior quality.

The forests are one of the most vital factors in the development of the interior of Alaska. They are absolutely necessary in the establishment and building up of the chief industries, mining and agriculture, essential in the construction and maintenance of pioneer roads and trails, and their presence is an indispensable element in making the country habitable.

The value of the interior forests should not be gauged by the size and quality of the trees for lumber, or their place for possible use in the general lumber markets of the Pacific coast. They have rather an economic value as a local necessity that can be measured by contrasting the development that will take place with their aid, with



the conditions that would exist without them and will exist if they are destroyed. Nor can the economic position of the forests be judged by their aggregate extent and total volume of wood and timber. In a country of vast distances, sparse population, high cost of labor, and

roots killed, and soon topple over. The past season was an unusually dry one in Alaska and an exceptionally large area of forest was destroyed. How extensive this area aggregates cannot be estimated with any degree of accuracy, but without question several million acres were

burned over. It is imperative that immediate steps be taken by the Government to stop this unnecessary damage.

#### PUBLIC OWNERSHIP PROMOTES DEVELOPMENT

The continuance of the National Forests and their efficient administration will have a very large influence on the development of the region in which they are located and on that of the whole Territory as well. They were established to ensure the protection, right utilization and perpetuation of the timber resources. Just as all National Forests, they contain resources other than timber for whose development provision must be



AN ALASKAN FISH CANNERY

The fisheries constitute one of the most important industries in Alaska. On the two National Forests there are seventy-five canneries, salteries and other fishing stations. These establishments use large quantities of material furnished from the National Forests, lumber for packing boxes, piling for docks and traps, material for docks, plank walks, etc.

meagre facilities for transportation, it is the presence of forest supplies immediately at hand that may make the development of industry and the establishment of homes in a given locality possible.

The interior forests of Alaska are being destroyed at an appalling rate by forest fires. Conditions existing in the western United States 25 years ago are repeating themselves in Alaska. The entrance of the white man brought the forest fire, and he has succeeded in a short period of less than 20 years in destroying the forests to an average extent of fully a million acres a year.

The summer season, though short, is hot and dry, and except where a great deal of moisture is in the soil and moss, the forest will burn. Especially on the slopes and benches the ground cover dries out sufficiently to carry fire. The fire usually does not burn rapidly but eats its way over the ground, burning up the vegetable duff and moss and any slash and snags that may lie in its path. The flat-rooted trees that depend largely on the vegetable deposit on the surface of the ground have their



A TYPICAL VIEW AMONG THE ISLANDS OF THE TONGASS NATIONAL FOREST

The Tongass National Forest in southeast Alaska comprises most of the wooded islands of the Alexander Archipelago. Many of the islands are characterized by relatively low elevations, though some of the larger islands, such as Baranof, Admiralty, Chichagof, and Prince of Wales, have high, rugged mountains rising in places above timber line. The Tongass National Forest, with a land area of approximately 15 million acres, has a shore line of over 12,000 miles.

made. The administration of these areas involves not merely the management of the timber. The Forests should be made to serve in the building up of the country, the establishment of industries, and the creation of opportunities for a permanent population.

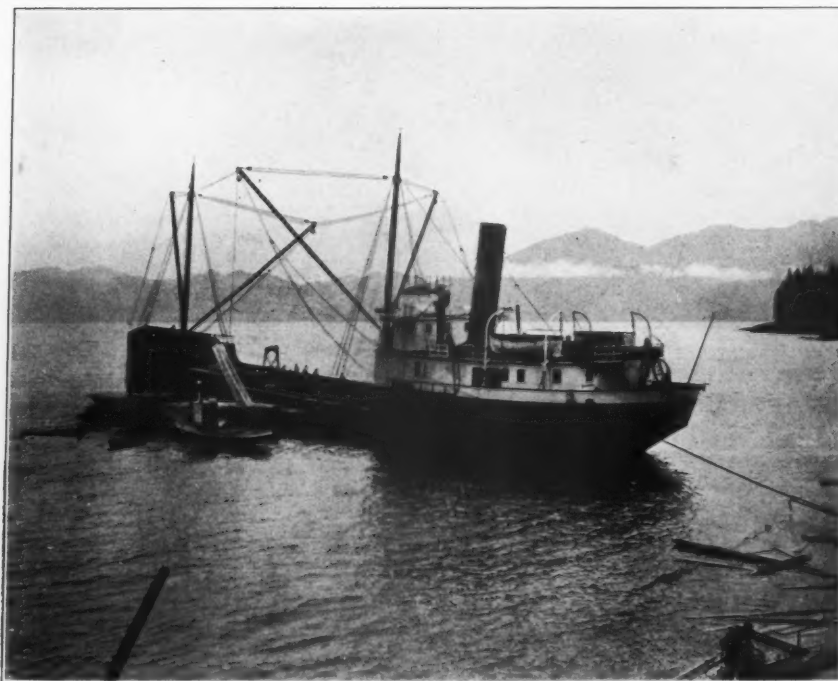
One of the advantages of public ownership is that

every user has an opportunity to obtain timber to meet his needs, personal or for commercial use, in such quantities as he requires and at reasonable terms. The settler secures the material required for his personal use free and without the need of a permit. The miner may use the timber for mining development that stands on his claim, and he can draw on the National Forest supplies if need be without the necessity of purchasing from private owners at such a toll as the latter might choose to levy; and he knows that if he develops a mine requiring large amounts he will not later be embarrassed in obtaining the material without which he cannot proceed. The fishing industry is using large quantities of piling for fish traps and docks, and this is obtained promptly, under a simple procedure, and at reasonable cost.



AN ALASKAN SAWMILL

There are upon the two National Forests over thirty sawmills. It is the policy of the Forest Service to encourage the development of the lumber industry. Approximately 40 million feet of timber are cut annually in the National Forests under sales, in addition to material secured by settlers for personal use. The largest single timber sale has been for thirty-three million feet.



LOADING LUMBER FOR EXPORT

Already a certain amount of timber has been exported from the Tongass National Forest in Alaska to the United States. A number of important shipments were made in 1913. The demand then fell off on account of the depression in the lumber market. Recently there have been shipped as much as one million feet of special spruce lumber for use in the construction of aeroplanes. The Sitka spruce is regarded by manufacturers of aeroplanes as specially suited to this purpose.

Material is in the same way being furnished from the Forests for wharves, bridges, and other structures required by public and private agencies.

There are upon the two Forests over 30 sawmills

which furnish the bulk of the lumber products used in the region. It is the policy of the Department to encourage the development of the industry, not only for small mills producing lumber for local community use but for larger establishments for distribution to meet the demands of cities, and of the large mines, and for export. The largest single timber sale so far made has been for 33 million feet. A number of large sales have, however, been under negotiation. Two different bodies of 600 million and 300 million feet respectively have been offered for sale, for the establishment of a wood pulp industry. The financial situation has prevented the consummation of these large sales, but it is confidently expected that in a short time the sale of timber will result in the development of industries manufacturing lumber and wood pulp on an extensive scale. The Chugach Forest is furnishing ties and poles for the construction of the Government railroad.

Were there a developed lumber industry, with adequate facilities for local transportation, much of the sawn material also could have been obtained from the National Forests.

It is the policy and practice to encourage agricultural settlement in the two Forests wherever suitable farm lands exist. The new railroad has caused a stimulus to agricultural settlement on areas in reasonable reach of it. More than one hundred settlers will be provided for on the Chugach Forest during the current year. On the Tongass Forest settlement is not taking place so rapidly but the number of new homesteads established is increasing each year. A factor of encouragement to the settler in the Forests is that where the land is unsurveyed, the final survey on the National Forest preliminary to issuance of patent is made by the Forest Service without cost to the settler, while on the public domain the settler has to pay the cost. This advantage is greatly appreciated by the forest homesteaders.

#### MINING AND WATER POWER DEVELOPMENT

The National Forests are open to prospecting and to the location of mines, just as is the public domain. The examination of the mining claim before issuance of patent is made by mineral examiners, usually by the mineral examiner of the General Land Office, who also examines claims on the public domain. The existence of the Forest in no way interferes with the acquisition of a mine if the mining laws are complied with. The Forest Service endeavors to aid mining through meeting the needs for timber, granting the use of land for power development, and, as fast as funds are available, through constructing trails and roads to open up heretofore inaccessible areas. At present the chief demand for water power is in connection with mining. These demands are being met and permits are issued for the use of Government lands for power development. Water power is abundant in Alaska and there are many opportunities in the two National Forests for the use of water power for industrial purposes. Mention has already been made of the



A TYPICAL, HEMLOCK STAND IN THE CHUGACH NATIONAL FOREST

The Chugach National Forest comprises over five million acres, covering the bulk of the coast forests centering about Prince William Sound and including also a portion of the interior type of forest on Cook Inlet. The principal species in the coast type are Sitka spruce and hemlock. While the timber is not as heavy as in the Tongass National Forest, there is nevertheless a large yield which will be of great importance in the development of that portion of Alaska. The spruce and hemlock forest frequently runs over 30,000 feet to the acre, and very large areas carry from between twenty to thirty thousand feet, with individual trees averaging from 1,000 to 2,500 board feet per tree. Individual specimens of spruce occur with a diameter of six feet and a height of one hundred and fifty feet.

possible use of power in connection with grinding wood for pulp. One large power site is now being considered by American interests with a view to possible use in manufacturing nitrates. Even under the present authority, therefore, water power is being developed; but such development would be hastened if it were possible to grant permits for 50-year periods, irrevocable except for breach of conditions set forth in the permits.

The Forest Service in cooperation with the Geological Survey has established measuring gauges on various streams in order to secure data regarding the flow, and thus determine more definitely the power possibilities where industries may be started.

#### SPECIAL USES FOR LAND

In the development of the two National Forests there is a great variety of special uses of land that do not fall under the head of agriculture, mining, timber development, or water power. Among the most important in southern Alaska is the use of sites for canneries, salteries, and other stations required in connection with the fishing industries. There are on the two National Forests over 75 canneries and simi-

lar establishments handling fish products, that are occupying land under permit or lease.

The law gives authority to lease up to 5 acres of land for purposes of this kind for periods of not to exceed 30 years. A larger area may be used, however, under a form of terminable permit. Ample space is thus provided the fishery establishments and there has been no difficulty in meeting their practical needs.

The special uses of National Forest land have thus been encouraged in every way possible. In many instances, however, considerable money is invested in manufacturing plants, stores, and other buildings and improvements, and the investors would prefer to be able to secure title to the land rather than to have a lease or



permit. My visit to the Forests last summer convinced me that there should be provision for the acquirement of title to such sites under reasonable conditions. The recommendation has been made at various times that the trades and manufactures act be extended to the Forests. I would not advocate the extension of that act exactly as it stands, but I believe that there should be authority for the Secretary of Agriculture to sell sites useful for trades, manufacturing, and special uses, after examination and appraisal of them, but only such sites as are not chiefly suitable for timber, water power, and medicinal springs, or are not needed for public purposes and general public uses.

#### ADMINISTRATION

The National Forests of Alaska pay their way. During the past five years the receipts from sales of timber and other sources have aggregated \$242,369.30; the expenditures have amounted to \$207,599.86. There has thus been a surplus during that period of \$34,769.44.

The administration of the Alaskan Forests is decentralized to a high degree. Very large authority is delegated to the local officers in order to avoid delays in transacting business which are incident to a centralized handling of the work in Washington. Aside from matters pertaining to alienation of Government land, more than 98 per cent of the Forest business is handled by the local force, only the largest timber sales, water power permits, and questions of policy being referred to the Washington office.

#### EFFORTS TO ABOLISH THE ALASKAN FORESTS

The Alaskan Forests have been a storm center of public controversy for a number of years. The coal land controversy of 1910 was started because attention was called to an attempt illegally to secure title to certain coal claims, some of which were on the Chugach Forest. The existence of the National Forest did not affect the validity of the claims, for the law for acquiring coal lands was exactly the same on the Forest as on the public domain outside. The Forest Service was brought

into the matter through its insistence that the mining laws be complied with on the National Forests before patent is issued. Many of these coal claims were finally rejected because there had not been a compliance with the law, not because a few of them were within the boundaries of the Chugach National Forest. Yet the impression has been spread abroad that in some way the Alaskan National Forests have interfered with the opening up of the coal fields, and this impression has been the basis for a great deal of hostile sentiment against the

existence of the National Forests. The Chugach again became a subject of public controversy in 1911, when an elimination of about 13,000 was made at Controller Bay. This elimination resulted in passing to private ownership a strategic location for a railroad terminal. Chugach Forest is now once more coming into prominence on account of the efforts to secure its entire abolishment and the throwing open of the land to general entry. The abolishment of either of the Alaskan Forests would be a very serious step backward; it would be a direct blow at the whole National Forest system, and an entering wedge to undo what has already been accomplished in public forestry.

The reasons for the continuance of the two Alaskan National Forests and their retention under National Forest administration are the same that underlay their establishment in the first place and the establishment of the National Forests in the States. A statement of these reasons would involve a description of the incidents which led up to the establishment of the National Forests, the depredations and frauds connected with the public forests before the establishment of the National Forests, the failure of private ownership to protect the interests which the public has in the good management of forests, the retarding influence of speculative ownership of timberlands on the development of agriculture, mining and other local resources, and the failure of private owners to protect their property or to provide for the perpetuation of the forests after cutting off the timber.



A FOREST RANGER'S CAMP IN WINTER

A great deal of the work of exploration in the forests of Alaska is done in the winter. This is particularly true in those portions where swamps, streams, and muskegs make summer travel slow and difficult. The Forest Service has already done a great deal of reconnaissance work in the winter, with the aid of the dog sled.

The continuance of the National Forests is necessary to secure adequate fire protection. I have already explained the danger of fire on the National Forests and how this problem is being handled. I have explained the great destruction in the forests on the public domain which are not under forest administration. The abolishment of the National Forests means the removal of the only organized forest protection that is being undertaken in Alaska today. The abolishment of the National Forests would invite destruction to all those portions of the forests which are subject to an annual fire hazard and serious damage to a large portion of the balance.

The abolishment of the National Forests would quickly put a stop to Government sales of timber such as are now being made and such as are anticipated in larger volume in the near future. Such sales would be stopped because the best timber would be privately acquired. Unbroken logging units would be a thing of the past. Private owners would quickly seize the strategic sawmill sites and permit operations only on such terms as they pleased to dictate. The orderly handling of the public timber in the public interest would no longer be possible. Under public ownership, the settler, the miner, and the industrial organization needing timber can secure it promptly and on reasonable terms, and they are assured of a continued supply protected from the exactions of holding concerns.

Adequate forest protection, the perpetuation of the forest resources at the same time with their full utilization, the protection of all the users of the forest resources fully insuring supplies to them at reasonable rates, and the making of other resources available for use side by side with the utilization and development of the timber are the particular public benefits which accrue from public forest administration.

#### GROWING FROM THE ROCK

MANY a traveler has saved himself from being dashed down a precipitate cliff or steep mountain side through the aid of some bush or tree, whose tough roots were entwined among the rock crevices. Throughout the entire Rocky Mountain area the tourist or the hunter from the East is struck with the marvelous capacity of the native trees for not only obtaining a foothold, but indeed making a vigorous and sturdy growth where there seems to be nothing whatever in fact but rock. Here and there may appear cracks in the solid rock of the mountain side holding a little coarse, dry, rocky dirt with about enough nourishment, one would think, to sustain a plant the size of a violet, or perhaps a tiny bush. Yet one frequently finds really large trees growing in just such places. On every hand may be practically solid granite, yet trees will grow out of it, and the most the observer can find are comparatively small cracks into which the roots disappear, completely filling them and even conforming to their shape. How the tree



Photo by Gilbert, U. S. Geological Survey.

#### WHERE DOES IT GET SUSTENANCE?

How large trees can grow out of almost solid rock is a question which the traveler in the Rocky Mountains and the California Sierra constantly asks himself. In many cases there is also a dry season of months duration with which the tree has to contend.

shown in the photograph, which is growing out of an apparently solid mountain of granitic rock at King's Canyon, California, can get enough of either water or plant food is a puzzle for which close examination offers only partial solution.

#### COLORING IN REDWOOD CONES

By O. E. JENNINGS

I WOULD like to call attention to the rich coloring matter contained in the cones of the California redwood.

While preparing for the herbarium of the Carnegie Museum at Pittsburgh some specimens of the redwood which were collected near the Muir Woods early in September, 1915, the twigs, with cones and leaves attached, were sprayed with a weak solution of bichloride of mercury in denatured alcohol, to which a small quantity of glycerine had been added. Upon the application of the solution to the cones the surplus liquid running out upon the sheets from them was noticed to be of a brilliant magenta-red color. A small quantity of the fluid was drained or into a bottle and now appears to be a rather transparent rich magenta in color.

This has not been written with the thought that possibly this coloring matter may not have been noticed before and that possibly it might be of some economic value. So far as I have been able to learn from the literature examined, it has not been listed among the organic dye-stuffs.

# The Bird Department

By A. A. ALLEN, Ph.D.

*Assistant Professor of Ornithology, Cornell University*

## OUR WINTER BIRDS AND WHAT THEY DO FOR US

**N**OW that the greater part of the country is covered with snow and ice and all nature seems inanimate, one's interest is greatly heightened in the few bits of life that still remain active. Tracks in the snow tell us of the nocturnal wanderings of a few furry mammals that still find food and need not hibernate. A twitter in the hedgerow or a call from the woods announces the presence of some fluffy ball of feathers that has withstood the storms and watched the departure of his fellows; but everything else is sleeping.

We are constrained to wonder what law ordains that these few hot-blooded sprites shall brave our winters and eke out their existence in a frugal dormant world instead of migrating to a land of plenty. There are some, of course, which feed upon seeds and we can understand how



### DEATH ON RODENTS

A screech owl. Every owl requires the equivalent of over 1,000 mice a year in order to live, and they are the most potent checks upon the increase of the dangerously prolific rodents.

they might still find food, and there are some which feed upon small rodents, and these, too, we can comprehend. But among our winter birds there are some which we know feed almost entirely upon insects and it is these that astonish us. How can they find sufficient food even to supply the energy necessary to keep them warm when every insect has apparently disappeared from the earth? Truly it is one of nature's paradoxes.

But had we the eyes of birds we would know that insects have not disappeared entirely. The tent caterpillars which denuded our orchards of their leaves during the summer, transformed into moths before fall, which laid their eggs in little varnished packets on the outer branches of the trees. In this stage they are passing the winter and next spring hundreds of little squirming caterpillars will hatch out and begin at once spinning the "tents" to pro-

tect themselves from the hungry birds. They will thrive and grow fat until every leave is stripped from the branch upon which they were hatched and then they will migrate to other branches, until finally the whole tree stands shivering in the summer breezes. They will acquire long spiny hairs all over their bodies so that few birds, except the cuckoos, will eat them. And the next winter there will be hundreds of little packets of eggs instead of one. But at this point a flock of ever-hungry chickadees will happen to come and, with their beady eyes, they will spy out these tiny lunch baskets and, finding food plentiful, they will stay until every egg has been eaten. The next year there will be scarcely a tent caterpillar on the tree.

Or perhaps it was the canker worms that denuded our elm trees.



### AN INSECT DESTROYER

A chickadee searching about an old tent-caterpillar's nest for the eggs deposited by the moths before dying. The tent caterpillar passes the winter in the egg stage and at this time countless numbers are destroyed by the chickadee and other insect-eating winter birds.

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### AN ASSAULT ON BORERS

A downy woodpecker with a billful of wood-boring larvæ for its young. In winter as well as summer the woodpeckers go about their work of destroying borers.



Every leaf supported a dozen worms and when we jarred a branch, hundreds of them dropped toward the ground on silken threads by which they could climb back up to their work of destruction as soon as danger was past. So many of them were there that, in spite of the flocks of birds, including even house sparrows, which came to feed upon them, countless numbers reached maturity transformed into fluttering yellow moths, again escaped the birds and mated with the wingless females which were crawling around the trunks of the trees. Now that winter is here, all the moths have died, but on the bark are countless little clusters of eggs awaiting the spring sunshine to transform them into



A GREAT WEED SEED DESTROYER

A tree sparrow. The tree sparrow has been estimated to destroy over 800 tons of weed seed each winter in the State of Iowa.

ravenous worms. But such is not to be the case. Flocks of nuthatches and brown creepers are finding the store and will search every crevice in the bark until few eggs are left to hatch.

In the spring when the apples were just beginning to form, small brownish codling moths appeared and laid eggs upon the newly formed fruit. The eggs hatched, the larvae bored to the center of the fruit and before long the ground was covered with wormy apples; no crop was harvested. Unwittingly the apples were left upon the ground. The worms crawled out and climbing up the trunks of the trees, hid beneath loose flakes of bark, thus to pass the winter. The worms in the center of the apples were inaccessible, but now is the birds' opportunity. Downy and hairy woodpeckers flock to the orchard. Up and down the trunks they go tapping every loose piece of bark, stopping only long enough to drill small holes and extricate the larvae. The best way to control the codling moth, we are told in books on fruit insects, is to fasten pieces of beef suet to the branches to attract the woodpeckers. They will come to depend upon the suet to carry them through times of stress, but most of their day will be spent gleaning the larvae from under the bark.

It is during the winter that many of our insect pests are most easily controlled by birds, so whatever we do toward attracting and feeding them through these cheerless months is far more than repaid.

But all our winter birds are not insect eaters. What do we owe to these that spend their time gleaning the seeds of weeds? According to Professor Beal, of the Biological Survey, at Washington, a single species, the tree sparrow, consumes over 800 tons of weed seed every year in the State of Iowa alone. Single meals of such birds as the bob-white and mourning dove, as shown by the contents of their crops, have consisted of over 5,000 seeds of obnoxious weeds.

If we stop for a moment to consider the reproductive capacity of weeds we can appreciate the need of such efficient engines of destruction as the birds. A single plant of henbane, for example, bears annually 10,000 seeds. If all the seed should germinate and reach maturity, in less than five years there would be a henbane plant for every square foot of land on the globe. Other weeds are even more prolific. The many species of sparrows, in this case, the juncos, the redpolls and the snow buntings that twitter about our weed-grown fields and gardens are yielding us a service almost as valuable as are the chidadees and woodpeckers in the orchard and woods.

There is also a third group of birds, the hawks and owls, much maligned by the ignorant, some of which remain with us all winter. Most of the owls and some



EVIDENCES OF INDUSTRY

Flakes of apple tree bark showing the work of woodpeckers in destroying codling moth larvae and pupae. The lower row shows the holes made by the woodpeckers, the upper the empty cocoons.

of the hawks are permanent residents wherever found. Owls swallow their food whole, when not too large, and later eject the indigestible bones and fur in the form of pellets. Find a hollow tree or a thick evergreen where an owl is accustomed to roost and search the ground for some of these pellets. Examine them and see how few contain feathers or bones of birds and how many the skulls of the obnoxious mice.

It is well that we have such a natural check upon the



BONES AND FUR SWALLOWED BY OWLS

Some owl pellets dissected to show that they are composed entirely of the bones and fur of mice and rats. Owls swallow their food whole and later eject the indigestible parts in the form of these pellets.

increase of mice, otherwise we would be overrun with them. The common meadow mouse, for example, has six or seven litters a year and from six to eight at a litter. With thirty-five as a conservative estimate of the young of a female each year, in five years we could have from a single female nearly five million offspring, doing at least \$100,000 damage each year. Fortunately each owl requires the equivalent of over a thousand mice a year in order to live and few mouse families are allowed to multiply unchecked.

There have been a few cases, however, when mice have multiplied unchecked for some years and we have had the so-called "plagues of voles," or plagues of mice. An interesting sequel of these infestations has been that they have always been followed by flights of owls, the unusual abundance of food attracting them from all directions and causing them to remain until the numbers of mice have again been reduced to normal.

Thus we see that although all nature seems paralyzed in the grip of winter, there are still about us a few hardy birds that have remained to finish the work of pest destruction which the weaker species so ably commenced during the spring and summer. Laying aside, altogether, the pleasure which their society and friendliness brings to us, surely the little that we can do toward feeding them as their natural food supply becomes exhausted and as was described in the last issue of this magazine, is one of our best investments.

#### GIGANTIC STONE BUFFALO SKULL

THE plains of Montana were once strewn with buffalo skulls and some are occasionally seen today, although good specimens are becoming rather scarce. What to more than one traveler has at first appeared to be the huge skull of the father of all buffaloes has proven upon closer inspection merely a remarkable likeness—a wind-carved piece of stone. Many a hunter, doubtless, seeing this great "skull" has galloped toward it sure that he had found a wonderful trophy. As he approached he probably had misgivings,

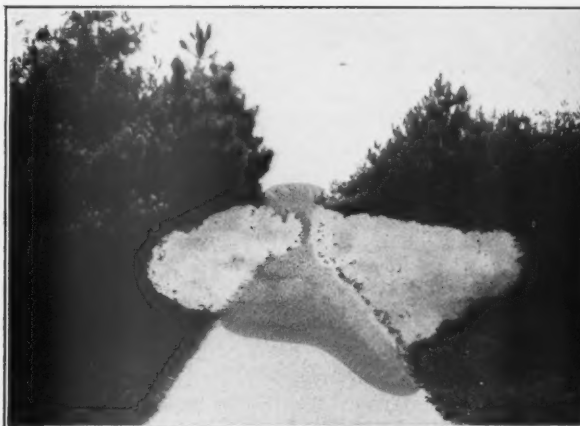


Photo by Beekley, U. S. Geological Survey.

#### IS THIS A HUGE BUFFALO SKULL?

No, it is a peculiar rock formation on the Montana plains which at a distance resembles the skull of one of the great animals which once roamed these plains in herds of thousands.

owing to the great size of the specimen, unless perhaps he took it for the head bones of some extinct monster, the petrified remains of which are found in the West; for there would lie the great skull on its side in characteristic position, one horn pointing upward, the eye socket, and the frontal bone. A close look has always shattered the highest hopes, the "skull" proving to be about 6 feet tall and composed of stone. So there it has been left, to mystify the next unwary traveler.



WALK THROUGH THE THIRTEEN-YEAR-OLD PINE GROVE

Not only does the owner expect to make this pine yield him a handsome profit but while it is reaching a marketable size he has the advantage of it adding greatly to the scenic beauty of his estate as is evident by this photograph.



INSIDE THE THIRTEEN-YEAR-OLD PINE GROVE

Showing how scientific planting and proper care of the trees is developing a stand that in a comparatively few years will have considerable commercial value. Col. Lowden now plants 50,000 pine seedlings every year.

## 500,000 Pines Prospering

By JOSEPH C. MASON

**O**UT in Oregon, Illinois, a scheme of reclamation is being worked out by Colonel Frank O. Lowden that is attracting the attention of forestry men all over the country. When Colonel Lowden began the development of Sinnissippi Farm on the Rock River, he found many apparently barren spots of sandy soil that offered an opportunity for experiment in tree planting. He determined to try pines. He started with seedlings. They grew rapidly and offered a suggestion that he promptly followed up. The accompanying photographs show the result. Here is a picture showing pines two and a half years old. Another picture shows an exterior of a pine grove thirteen years old, this grove being the first planted by Colonel Lowden. A third picture is of a beautiful walk through the thirteen-year pines which are within a stone's throw of the Rock River. The fourth

picture is an interior view of the thirteen-year grove. For years the needles have been dropping from the trees and the ground is hidden beneath a light brown covering, soft and inviting.

Colonel Lowden's experiment ceased long ago to be an experiment and became a hardheaded business proposition. He abandoned the use of seedlings and substituted transplants. At the rate of 50,000 per year, he has dotted his farm with these slips of waving green until today he has 500,000 pine transplants and trees, varying in age from two to thirteen years, upon his farm. In a few years Sinnissippi Farm will be a great green spot, winter and summer. Many people in the middle west have never seen a pine tree, but they will be able to see them at their best only one hundred miles, as the crow would fly, west of Chicago.



THESE PINES ARE TWO AND A HALF YEARS OLD

They are part of the five hundred thousand pine transplants and trees upon the farm of Colonel Frank O. Lowden, at Oregon, Ill. Note the large yearly growth so plainly visible.



A THIRTEEN-YEAR-OLD PINE GROVE

This grove grown from seedlings on Col. Lowden's farm is an indication of how the planting has grown from an experimental to a hard-headed business proposition.



# Ornamental and Shade Trees

*A Department for the Advice and Instruction of Members of the American Forestry Association*

## REINFORCING TREES

BY HAROLD J. NEALE, *City Forester, Worcester, Mass.*

IT IS an accepted fact that shade trees on public streets increase property values. This of course is in proportion to the size and condition of the trees—as a small tree would not increase values very greatly while an old, weakened tree would be about in the same class, as far as value is concerned. The question arises then is it not possible to make these old trees safe and eliminate their weaknesses? They are the heritage of generations past and are a necessary adjunct to old settlements; as in New England where we have old colonial mansions with beautiful spreading elm trees as their proper setting.

On private lands these trees, set out many years ago, have had a free and easy existence and are in many cases sound and free from any weakness. The street tree of the same generation, however, has had a different battle to fight. Hitching horses to a ring bolt fastened into the trunk of these street trees or by throwing the reins around the trunk was not uncommon and was, of course, an invitation to the animal to gnaw and thus injure the bark on the trunk. This was immediately followed by the entrance of fungus diseases, causing decay and the gradual permeation of the mycelium or root hairs of the fungus which today leaves an ugly scar extending in many cases through the heart of the tree. This presents a proposition to the city forester or tree man. It is the proper procedure for making the thoroughfare safe for pedestrians.

With the aim of saving the old trees, making them safe, sound and healthy the arboriculturist of today is striving quite as much as he is in the planting of new trees for future generations to enjoy. Bolting insecure

limbs, chaining them and similar measures have been practiced for a number of years. In New England we see many large elm trees girdled by heavy iron bands which were improperly placed. In other cases heavy chains have been placed around limbs, not girdling them, but causing the bark to die on the side in contact with the chain. In some cases the bark and the cambium cover the chains, embedding them into the heart wood of the limbs and they cannot be discerned.



A METHOD OF TREATMENT

An elm which, despite its injuries, is still of value and worth preserving. If an attempt had been made to remove the decayed portions without reinforcing the trunk, the tree would probably have blown down, so an iron cable was fastened as shown in the right hand picture and tightened sufficiently to allow for the swaying of the trunk. The decayed portion was then removed and the cavity treated.

amount of energy. A bolt, however, should not be placed high enough to allow any swaying of the limbs, which would have a twisting effect on the bolt which would in time weaken and break owing to its inelasticity. In case this is necessary the bolt should be placed low and a chain or cable placed higher. The size of the bolt is also an important factor, and the growth of the limbs with their increasing weight must be considered. The placing of a bolt in a tree will not in all cases induce stronger growth, but it is necessarily a permanent factor in holding the tree together, while in others a bolt may be placed

The process of bolting, although not difficult, requires a certain amount of study and care. Mechanical forces must be taken into consideration. The stronger of the limbs to be bolted must be used for the support and the bolt placed at right angles to the side of the weaker limb, otherwise the weaker does not receive the maximum pulling forces of the bolt, to hold it in place. In the case of a split tree the forces must be divided so that each limb is exerting an equal leverage on the other. The bolt must be placed as high as possible in order that it will be able to exert a maximum amount of tension with a minimum

for a precautionary purpose and as the tree grows it strengthens the weak places itself, but the bolt is always a reserve force. In boring the hole it is necessary to countersink through the bark and sufficiently into the wood to allow for the washer and head of the bolt or nut to be entirely beneath the cambium or living tissue. It should be disinfected and the washer and head or nut embedded in tar or paint to keep out moisture. The space around the nut can then be filled with elastic cement, allowing the cambium and bark to cover the area in time. The bark should be cut away slightly in a  $\Delta$  shape to allow proper healing without rotting of the bark as will follow if left rounded. This is the same process as is practiced in all scientific cavity work. The washers must never be placed against the bark as growth will immediately cease at the point of contact and decay will commence, which in time will leave the washer free or allow the split to open. Bolting is many times practiced unnecessarily, but if properly placed the bolt becomes unnoticed in time and is always furnishing an "ounce of prevention."

In cases where a bolt is not sufficient to hold the limbs it is best to chain or cable them. This allows for any necessary swaying. The chain or cable is held by eye bolts, which are placed in the same manner as the bolts, with nuts embedded and the pulling forces at right angles to the supported limbs. The threads on the bolts are made longer than necessary to allow for taking up the slack and are cut off when the chain is in its final position. A set of strong blocks or a lineman's "come-along" are a great help in drawing the limbs together as they can be placed much farther out on the branches and therefore exert a greater influence with less energy.

During the past few years different methods of chaining and bolting have been tried and the use of wire rope cable has proved very satisfactory. Its breaking strength is much above that of the same size chain and while the chain is only as strong as its weakest link a wire rope cable is not weak in any unit if properly made and tested. It is pliable, easily established and practically unnoticeable, especially when the tree is in full foliage. This wire rope cable is fastened by clamps or in some cases by tying or splicing. It is very essential that the wire rope be of sufficient size to hold the load that is placed on it and of more importance that eye bolts be strong enough, especially in the eye, which, in many cases, are made by blacksmiths, who do not pay proper attention to the temperature of the iron when it is made. It should always be subjected to a test that will insure its being equal to the strength of the cable and thus to be able to hold its part of the load.

There is another phase of the strengthening of the tree which to my mind has never been seriously considered. Illustration No. 1 is an elm tree which although not extremely large is of sufficient value to the abutting property owner to make him willing to spend some money in saving the tree. The tree is on an important thoroughfare which many people pass daily. Its exposure is such that a twisting wind storm would be liable to blow it

down. Its trunk was perforated with mycelium and decay penetrated more than half way through. If an attempt had been made to remove the decayed portions without reinforcing the trunk it would, in all probability, have blown over. Therefore, an iron cable was fastened to three eye bolts, as seen in illustration No. 2. This cable was tightened, but play enough has been allowed for a swaying of the trunk in any direction. The decayed portions of the wood were then removed and the cavity treated with creosote and tar and will be left exposed in this manner for the winter when an examination will be made to ascertain if the fungus has been entirely eliminated and when such conditions exist it will receive a proper filling, mostly for appearance sake as filling does not seem to materially strengthen a tree or eliminate diseases or insect invasions. There are, of course, many ways in which this cable can be placed, taking into consideration the weight of the top of the tree and the weakened condition of portions of the trunk will necessitate the placing of the cable in different positions. On some trees it would be necessary to use a much heavier cable than others. The forces could be mathematically computed and proper wire and position for fastening could be figured.

This is but one of the many problems which confront the forester of today and if by this simple method the priceless trees of our ancestors can be preserved, protected and made safe for this public there should be less use for the axe along our highways.

#### TREE WORK FOR JANUARY

1. Remove all the dead and diseased trees that were marked last Fall. In removing these trees be careful not to destroy the undergrowth of valuable shrubs and young trees. In most cases it will be necessary to first cut off the first large branches before felling the main trunk and in some cases it will even be necessary to remove the trunk in sections. By means of ropes the various parts may be lowered in suspension from neighboring trees without allowing them to come down with force on the growth underneath. In piling up the wood it is also wise to keep the diseased and infested parts apart from the good wood so that in the spring if it becomes necessary to keep some wood on the premises, one can be sure to keep only the good wood and destroy the wood which is liable to spread insects and disease.

2. All the brush should be burnt while the snow is on the ground in order to prevent fire.

3. Take care of all wounds. On most ornamental trees on the lawn and on many trees in the woodland one will generally find shallow wounds that need attention. Bruises and fire are generally responsible for these wounds. The bare wood exposed to the weather softens and attracts disease and insects, which eventually injure the main body of the tree. This month is an excellent time for attention of this character. The edges of the wounds should be freed from loose bark and the exposed wood should be covered with coal tar.

If the tar is found to be too thick in cold weather, it may be thinned down by mixture with some creosote. Some persons use paint in place of tar; but the latter is preferable because it does not peel in course of time as paint does and possesses better antiseptic qualities than paint.

#### QUESTIONS AND ANSWERS

Q. How may I tell whether my tree is ailing?

M. B. M., *Plainfield, N. J.*

A. So much depends upon the special local conditions that it is difficult to set up any series of symptoms. But in a general way the layman may surmise trouble when he finds any of the following conditions: Pale leaves in summer time when they should be perfectly green. This may indicate an excess of foreign gases or salts. Dead tops indicate root trouble and fungous growths protruding anywhere from the trunk or branches indicate decay underneath. Withered leaves show growth or inability to take in the requisite amount of water, though the water may be present in the soil.

Q. What trees and shrubs will stand the shade?

L. A. F., *Sewickley, Pa.*

A. Beech, hemlock and dogwood are best suited for that purpose. The maples will also tolerate considerable shade, but the beech and hemlock will stand very deep shade.

The following shrubs will be found suitable for planting in the shade of other trees: Blue Beech, Juneberry (*Amelanchier botrapium*), Spice Bush, *Azalia Nudiflora*, Red Berried Elder, *Viburnum Prunifolium*, *Viburnum Alnifolium*, *Viburnum Cassi Nodes*, *Viburnum Acerifolium*, Sweet Pepperbush, Witch Hazel, Mountain Laurel, *Rhododendrons*.

Q. When shall I prune my fruit trees?

A. L. C., *Nashville, Tenn.*

A. In March.

Q. What pruning tools do I need for my 12-acre estate?

A. K., *Joplin, Mo.*

A. Two small, single edged hand saws, 1 pole saw, 1 pole shears, 1 30-foot extension ladder with hickory rungs, 1 12-foot single ladder with hickory rungs, 1 lineman's belt, 1 pole brush for tarring wounds high up on the trees, 1 small brush for tarring small wounds lower down, 1 heater, to heat the tar, 1  $\frac{3}{4}$ -inch chisel, 1  $\frac{1}{2}$ -inch gauge, 1 mallet, 1 keg refined coal tar, 5 gallons creosote to mix with the tar.

Q. How far apart shall I plant Norway maples in front of my house on the city street?

C. C. J., *Worcester, Mass.*

A. Thirty to thirty-five feet apart.

Q. Have you had any experience in clearing weeds from a lake or pond in which the depth of water varies from two to five feet?

E. S. P., *Buffalo, N. Y.*

A. Take Portland cement and throw broadcast on the water, quite thickly, twice within one week and once

again in a month or six weeks. This will look white on the surface of the water for a while, but in a few hours it sinks, leaving the water thoroughly clear.

Q. What is the best spray for the cottony scale, and when should it be applied? Is winter spraying ever advisable?

W. W. M., *Rogers Park, Ill.*

A. The cottony maple scale can be sprayed effectively with a ten per cent solution of kerosene emulsion in early June, at the time when the young appear. A forcible spray of water will often dislodge the cottony masses and scale. On small trees, brushing off the insects with brooms dipped in kerosene emulsion has often worked well.

Q. Why is the English practice of root pruning on fruit trees growing strongly to tops, but not bearing fruit a help to increase the amount of fruit, if at all?

W. W. M., *Rogers Park, Ill.*

A. The practice of root pruning fruit trees for the purpose of increasing the fruit product is a very good one, especially in old trees where the main roots have been allowed to grow at the expense of the fibrous rootlets. In connection with this work I would suggest that you thin out the crown and cut it in quite severely.

Q. Do you advise the use of asphaltum after pruning and as a wound dressing?

W. W. M., *Rogers Park, Ill.*

A. I have never used asphaltum for covering roots, and on general principles would prefer a refined coal tar which I know from experience as having the penetrating and antiseptic qualities required for protection against fungous attack. If your coal tar is too thick, you might thin it down with a refined grade of creosote.

Q. I am building a residence located on a hill, or butte, about 1200 feet long and 600 or 700 feet wide at the base. I wish to cover the hill with some low-growing, hardy bushes with compact tops, something that will never grow high and which will thrive without much water and cover the hill fairly well so as to amount to a jungle or thicket. Or, I may conclude to plant grape vines to cover the entire hill, if advisable. The top of the hill is a graded plateau about 180x250 feet in area and this I will cover with that rich and always handsome forage plant, alfalfa. Over against this hill, which is a detached elevation standing by itself at the mouth of a broad canyon, I intend to make a spread in the way of California poppies. It will be a "field of the cloth of gold." I shall greatly appreciate a list of the shrubs and vines which will be likely to thrive on my "oblong hill," bearing in mind that they must be dry-climate plants, not requiring any excess of water.

H. G. O., *Los Angeles, California.*

A. The coral berry *Symphoricarpos vulgaris* would probably be as satisfactory a plant as any to use on your hillside. This plant roots from the tips of the branches and spreads quite rapidly. It will attain a height of 3 or  $3\frac{1}{2}$  feet and succeeds well in dry soils and under adverse conditions. *Ampelopsis* of some species or variety, or some of the nearly related *Vitis* or grapes could be successfully



used, and the sand verbenas would be very satisfactory also. *Lycium chinense* is also frequently used for covering rough banks, but I have an idea that the *Symphoricarpos* would be better, but if you desire a variety of material some occasional clumps of this material could probably be used to advantage. Your "field of the cloth of gold" should be most beautiful, and the alfalfa is a very practical idea.

#### A RECOMMENDATION

By HON DAVID F. HOUSTON,

*Secretary of Agriculture, Vice-President American Forestry Association.*

IN his annual report to Congress Secretary of Agriculture Houston makes the following recommendation relative to the purchase of forest reserves in the Southern Appalachians and in New England: "The wis-

tion of \$11,000,000 was made for these purchases to be expended during the fiscal years 1910 to 1915.

"The funds made available under the first appropriation are nearly exhausted. In its report to the Congress for the fiscal year 1914 the National Forest Reservation Commission recommended that purchases be continued until about 6,000,000 acres shall have been obtained and that the Congress authorize appropriations through another five-year period at the rate of \$2,000,000 a year.

"As fast as the eastern lands are acquired they are placed under an administration similar to that of the western forests. Situated for the most part near densely populated communities, the resources of these lands are readily available. There is immediate need for their timber, mineral, water, and forage resources, and also for their development as recreation grounds. Purchases should continue until areas sufficient to be influential in protecting the region are acquired."

#### THE THIRTY-FIFTH ANNUAL MEETING

EVERY member of the American Forestry Association who can possibly do so, is urged to attend the thirty-fifth annual meeting, to be held in Boston, Monday and Tuesday, January 17 and 18. Headquarters and meetings at the Copley Plaza Hotel.

Governors of several of the New England states will be present and they have also appointed state delegates, while every city and town of importance in New England, together with most of the organizations interested in forestry conservation, have selected delegates to represent them. It is expected to prove the greatest gathering of forestry interests that has even been held in any part of the United States.

Governor McCall, of Massachusetts, and Representative Gordon Lee, a member of the National Forest Reservation Commission, will be the guests of honor at the Forestry Dinner on the night of January 17, and there will also be several other noted speakers.

The chief topic for the meetings and the banquet will be the effort to secure an extension of the Weeks Law appropriation for the purchase of Federal Forest Reserves in New England and the Southern Appalachians, and there will also be reports on national and state forestry and municipal forestry, shade tree planting, diseases and insects which attack trees and on other phases of general and local forestry work.

Tickets for the banquet are \$3 each. Reservations should be made at once; both ladies and gentlemen are to be present. Write to the American Forestry Association, Washington, D. C., for reservations.

#### RECOMMEND A NEW MEMBER

A sample of AMERICAN FORESTRY will be sent to every person recommended by a member.



HON. DAVID F. HOUSTON

*Secretary of Agriculture, vice-president American Forestry Association.*

dom of retaining the western forests under national control is indicated by the course which the Federal Government has found necessary in dealing with the mountain lands of the East. These lands passed into private hands directly from the States. Their present condition furnishes an example of what happens when mountain lands are controlled by individuals. The results became apparent years ago. Erosion, loss of soil, and clogging of streams with silt and stone followed the removal of the timber. Stream flow became more irregular and great losses resulted to property through increased floods.

"It was necessary in the East to acquire by purchase the same class of lands which in the West were put into national forests merely by proclamation. An appropria-

## Children's Department

*Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.*

BY BRISTOW ADAMS

WE have seen how the individual trees grow either from seeds or by means of sprouts; we have taken up the different steps in that growth, and the manufacture of the food of the tree into living tissue which is converted into wood. In the first article something was said of the differences between tree growth in the forest and in the open; and in the little Christmas story with the three trees personified, some further facts were set forth about the growth of trees in a community.

The difference between the study of forestry and tree study is that the forester devotes practically all of his attention to the behavior of trees in the larger groups. Here they cannot act independently, but act and react upon one another, helping sometimes, and hindering at other times. In the long run, however, the forest community is of benefit to the members which are able to win out in the first struggles, and can hold their own until they have reached full growth.

This has been called by Charles Darwin "the survival of the fittest," or in other words, those forms of life which are able to fit themselves into their surroundings are the ones which keep on growing. They have won out in what Darwin also characterized as "the struggle for existence."

In no place is this struggle for existence more severe and more exacting than in the forest. Even before Darwin announced his discovery of these principles, which changed the whole trend of science, a man who was partly a forester had the same thought that Darwin later gave to the world. Darwin himself gave this forester full credit.

The man's name was Matthews. He was a designer of ships, and in those days ships were all built of wood. In his study of the kinds of trees which were best suited for masts, he found that the straight, and tall, and slender trees without branches except at the top were the ones to be used. From that point he studied the conditions which produced such trees, and found that the conditions could be had only in a closely grown forest where the trees had to continually reach up for light, and where the lower branches were shaded out and died, the trees in this way becoming self-pruned, as the foresters say. The small twigs that dropped or fell to the ground, and with the leaves which were shed by the trees each year, went to form the forest soil or forest floor.

THE forest, then, is a great room, or nursery, made up of families, with parents and children. On the ground is this forest floor, and at the top, or ceiling, next to the sky is the forest canopy of green

branches. Each of these has its use. Many writers have noted this roomlike character of the forests. Some have spoken of the aisles made by the forest trees; our American poet Bryant says "The groves were God's first temples;" and architects have found inspiration in the trunk and branch forms of the trees for some of their most wonderful buildings. For our purposes, however, the forests are tree homes.

NATURE is always wasteful. She spreads her gifts like a spendthrift. If a forest is to be grown, nature produces thousands, even millions of seeds, yet only a small part of these grow to be trees. Nature thus provides for those that may be eaten by beasts and birds or those that may be destroyed by other means. Then, after the seeds have been sown by the wind and have found resting places in the forest soil, and the little seedlings peek above the ground, the fierce struggle begins. Each one crowds its neighbor, trying to get all that it can use of the light, and warmth, and moisture. For one reason or another, certain individuals become stronger than their fellows, and are therefore able to get more of the good things of life. It is very strongly a case of "To him that hath shall be given." The smaller trees thus get crowded out. The battle goes on during the whole life of the tree, and "the battle is to the strong."

THIS is the time of year to see how this battle goes forward, to see how the trees have to set themselves one against another. If you go out into the thick high woods now and look up, you will see that the crowns of the trees nearly fill all of the overhead space. Each tree has reached up, struggling to get ahead of the others, looking for its place in the sun, because without this place, the leaves can not digest the food which makes the tree grow.

IN your walk through the woods you will find some open spaces. Possibly an older tree has decayed and fallen, or man has cut out for his own use one or more trees, and has left an opening in the canopy, or crown cover. On the ground you will see the stumps, and you may be sure that there was no vacant space overhead when the trees were standing. Unlike the ground where the trees are thick, this space will be covered with brush which may not look like a forest growth, but at least is the beginning of one. Here are the young trees—the children of the forest—struggling against one another for light and place. Spreading bushes may seem to be trying to check the tall, slender

striplings back, yet some of the latter are managing to get through, and once clear, they will shoot up fast because they will then be fully entered on their race for life. As their tops close together the slower ones will in turn be shaded out even though they may have survived the first struggle. The shade will deepen; their stems will not be able to thicken up because they will not be able to manufacture plant food. Then will follow the successive deaths of those which are the least fit to survive, and the open space which you see now will in a few years be occupied by not many more trees than were originally there.

If you look about you will find certain trees that are crooked or lopsided, with all of their branches to one side where they could more readily get at the light, away from some tree which is crowding them. Some trees have fitted themselves to survive under dense shade, and can hold on to life for many years, waiting to take their places in the upper stories of the forest when openings occur.

Yet as we have seen in the earlier articles, it is not always a struggle. The older trees are not only the parents, but are actually the nurses of the smaller trees. They protect them from the fierce heat of the sun, which would soon wither a growth which has become accustomed to coming up in the shade. They protect the smaller trees from winds and from heavy snow and sleet, which would break them down while they were still young if it were not for the nurse trees or big brother trees that take the brunt of the storms. These phases of the life stories of the trees the forester has to read, and indeed, to know by heart. He is able to overcome some of the wastefulness in nature, and he can so manage the forest that he can help to grow better trees than can be grown by nature unaided.

But the man who does not think of forestry is likely to add to nature's wastefulness. If he goes into the woods to get fence posts, or repair material, or logs for the sawmills; and if he cuts out the best trees of the most valuable kinds, his timber tract will be getting worse and worse all the time. Those trees which he does not want and can not use will be left to take the place of the good ones which he cuts, and in the course of time he will have a woodlot made up of timber weeds. The forester, on the other hand, will see that enough of the good trees are left to furnish a succession of crops, and to furnish seed for future crops. He will destroy the trees that are of no use to him. In New York, for example, he will get rid of dogwood, the scrub oaks, and gray birch, and will favor hickory and white oak in a hardwood stand. In most places in the state where white pine grows successfully, he will favor white pine. In a shorter time than nature can bring it about, he will have a well-stocked stand of useful trees.

It can be seen, therefore, that when man enters the fight, which the trees are waging against each other, he will throw an advantage to some trees and will put obstacles in the way of others. If he knows the ones to favor, he will increase the usefulness of the forest to

man, but if he interferes blindly, taking the best of what he wants, he is very likely to throw the balance against the very trees that he ought to have.

This is the reason why everyone should know something about forestry, and should learn to use his or her eyes in the woods to see how the trees grow, how they struggle against each other, and how they help one another. If one does this, he will soon get acquainted with the general facts of forestry, and will know the trees with an intimate and personal feeling which is much better than merely knowing their names. He will realize why the foresters make shade frames over the seedling beds in the forest-tree nurseries, and will realize also why the foresters in setting out plantations will supply what are known as nurse trees, either to furnish shade or to stimulate the young trees into the necessary upward growth.

The next story will tell about the different kinds of trees, but in a new way, not according to their family relationships as the scientists know them, but according to their uses to man.

#### STATE FORESTRY IN COLORADO

AS the greater portion of the timbered area of Colorado is protected by the National Forests, the State Forester, W. J. Morrill, is bending his energies toward encouraging tree planting, and the preservation of fence posts in the plains region of eastern Colorado. He has just returned from a five weeks' lecture tour in that part of the State, where he had charge of farm institute work, the team comprising a dry farming expert, a dairyman, and the State Forester. Institutes were held in twenty-seven communities, good interest being shown in all places.

Much of the land has been homesteaded during the past ten years; the farmers generally are prosperous, and the time is propitious to advocate tree planting for windbreaks and the ornamentation of dooryards. In most places visited, the black locust, next to poplars and native cottonwood, is most commonly planted, as borers are attacking the former species only in a few localities. Mr. Morrill is advocating in much of the territory visited the "roof scheme" for windbreaks, using the black locust for the center row, honey locust for flanking rows, and a border of tamarix, Russian olive, and wild plum.

He also exhibited a model of a farmer's fence-post preserving plant for the open-tank treatment of posts, but also strongly recommended the brush treatment with coal tar.

It is probable that a State nursery will be established next spring at Fort Collins, to supply suitable stock at cost of production.

Villages in the State are also becoming interested in reform in street planting, and interest is being shown also in the landscaping or planting of village and rural school grounds.



## Further Appropriations Needed

THE National Forest Reservation Commission, consisting of Secretary of War Garrison, Secretary of Agriculture Houston, Secretary of the Interior Lane, Senators Gallinger and J. W. Smith, and Representatives Gordon Lee and Hawley, in its report to Congress in December, recommends a further appropriation of \$10,000,000, for a period of five years, to continue the purchase of forest reserves for the protection of the headwaters of navigable streams in New England and in the Southern Appalachian States.

Secretary of Agriculture Houston, in his annual report, makes the same kind of recommendation.

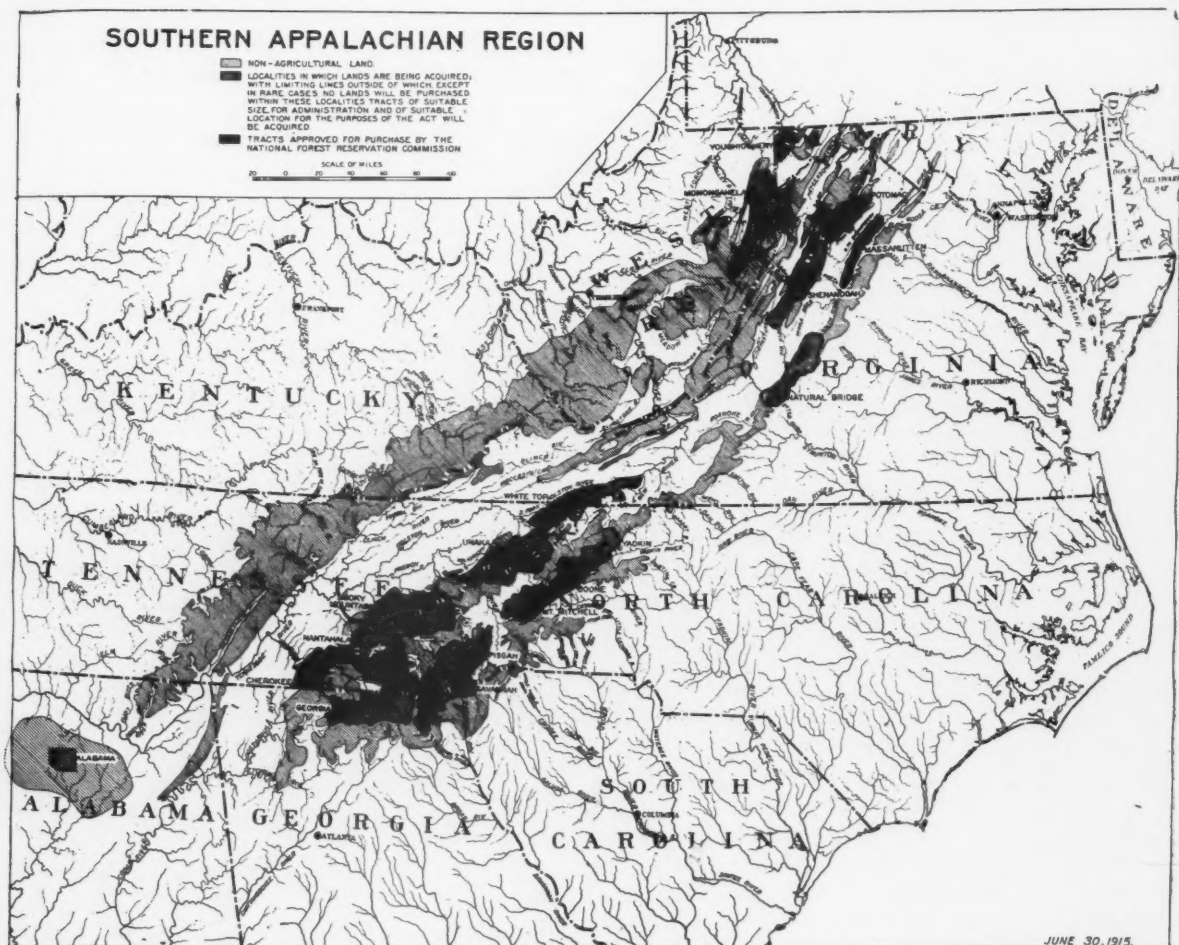
In order to bring this matter to the attention of Congress, the American Forestry Association and various Boards of Trade, Chambers of Commerce, forestry and conservation organizations, and other interested associations in the States concerned, appointed a committee consisting of Dr. Henry S. Drinker, president of Lehigh University and president of the American Forestry Association; Percival S. Ridsdale, secretary of the American Forestry Association and editor of AMERICAN FORESTRY,

and Philip W. Ayres, forester of the Society for the Protection of New Hampshire Forests.

This committee, shortly before the holidays, had conferences with Secretary of Agriculture Houston, Chairman Lever, of the Agricultural Committee; Representatives Lee and Hawley, of the Forestry Reservation Commission; Senator Weeks, Senator Hollis, and others interested, and as a result has arranged for a hearing before the Agricultural Committee in the latter part of January. At this hearing there will be present representatives of the New England and Southern Appalachian States, and any others interested, in order to present to the committee their arguments as to the necessity of continuing the work of purchasing forest reserves, which has been going on since 1910-11, and in the hope of securing, from the committee, action which will result in the further appropriation needed for the work.

### THE RECOMMENDATIONS

The Forest Reservation Commission, in its report to Congress, states in detail the work that has been done,









designates the areas purchased and the areas examined for purchase and then in recommending further appropriations says:

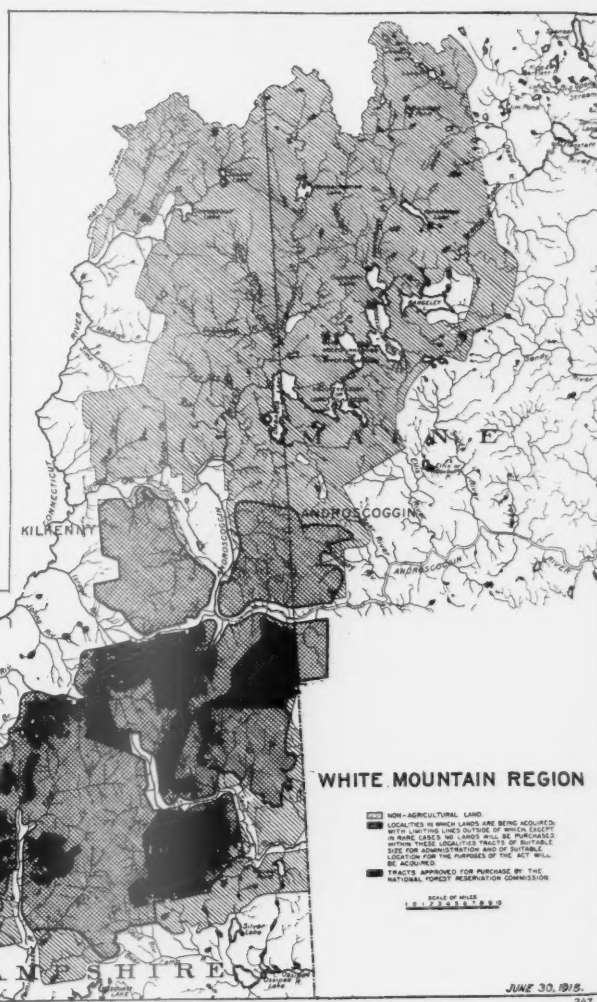
Appropriations for purchase ceased with the fiscal year 1915. The balance which remained unexpended at the close of the year will be used largely to fill the gaps between the lands which have already been acquired so as to better fit them for administration. In its last annual report the Commission stated that it is practicable for the Government to acquire lands of the character desired in sufficient area for successful administration and at reasonable prices. By the employment of condemnation where titles are defective, a safe title may be vested in the United States.

The wisdom of the Government's acquiring and administering extensive bodies of forest land at the headwaters of the great navigable rivers has become entirely clear. Far-reaching good will result in safeguarding the streams from erratic flow and in protecting the watersheds from destructive erosion to which they are subject when unwisely cleared. A basis will be afforded for permanent industries in regions which otherwise are in danger of ceasing to be productive and of becoming a menace to the navigable rivers and to the communities situated upon them.

The appropriations which were made have been sufficient to start the work and make very substantial progress. Through the care exercised in making purchases the lands acquired are so well situated for administration and use that even should appropriations cease considerable good would be accomplished. But the progress should not stop at this point. It should go further. However, the Commission does not look upon the program

as requiring expenditures through a long period of time, but rather through only a limited number of years.

Renewing its recommendations of last year, it is the judgment of this Commission that the work can best be done under appropriations covering periods of five years each, the appropriations becoming available annually and remaining available until expended, as is now the case. Experience has shown that it is impracticable to at-



tempt to do this work under appropriations which expire with the fiscal year. It is also of the utmost importance that appropriations be continued through periods of not less than five years.

When the work was begun a force of timber cruisers, title examiners and surveyors had to be assembled and trained, a task which required two years. It would be most unbusinesslike to have to disband this force on account of a gap in the appropriations. If purchases were suspended it would also require much time and expense to build up a new force and get under way again the negotiations that would be broken off. Many of the cruises and

#### THE AGRICULTURAL COMMITTEE

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 HON. CHARLES B. WARD, Rep., DeBruce, Sullivan Co., N. Y.  
 HON. J. KUHIO KALANIANA'OLE, Rep., Hawaii.

examinations which have been made and which had not resulted in purchases would have to be made over again and the intimate touch with the land situation which is now enabling purchases to go forward smoothly would be lost. From every point of view it is highly desirable that appropriations continue without a break.

It is again emphasized that the Congress established this project upon the basis of an appropriation of \$11,000,000. One million dollars appropriated for the year 1910 never became available at all. Instead of hastening into purchases in order to utilize the appropriation for the year 1911, which would have been unbusinesslike, and would have resulted in loss to the Government, the Commission adopted the conservative policy of making purchases only after full information had been secured in regard to each tract and reasonable prices had been obtained. By so doing it established the work upon a sound basis, but nearly all the \$2,000,000 appropriated for the year 1911 reverted to the treasury. These appropriations which were not utilized ought to be reappropriated.

In the judgment of the members of the Commission the work should be carried forward in a steady, systematic way. Since the existing appropriations ceased with the fiscal year 1915, it is recommended that action be taken by the Congress during the present session to continue the appropriations at the rate of \$2,000,000 per year from the fiscal year 1917 to the fiscal year 1921, inclusive, and that it make all the appropriations available until expended.

#### CORNELL SUMMER FORESTRY CAMP

FROM July 19 to September 21, 1915, the professional forestry students in the Department of Forestry at Cornell University were in camp in the Adirondacks. These ten weeks formed a regular part of the work of the third term of the New York State College of Agriculture, the first six weeks of the term, June 7-July 17, being spent at Ithaca.

The camp was near Lake Ozonia, St. Lawrence County, in the western part of the Adirondacks, about thirty miles from the Canadian boundary and fourteen miles from the nearest railroad station, St. Regis Falls. It was in the midst of timberland being logged over for several large commercial companies, so that the students had opportunity to observe lumbering operations at close range.

Besides the lumbering work the students were given regularly scheduled examinations and reports to hand in promptly. This, with their courses in silviculture, mensuration and forest utilization, kept them very busy with little time for recreation. To go to the Cornell forestry camp is not like taking a summer holiday, the students say. The camp itself was between two lumber camps and near a saw-mill. It was on a timber tract of eight or nine thousand acres belonging to Mr. F. A. Cutting of Boston. Beech, birch, maple and hemlock were being cut out.

Two summers of this camp work are required as a regular part of the professional course leading to a degree in forestry at Cornell. In addition the students must put in three months, in the autumn of the senior year, in obtaining practical experience in lumbering and logging. One of the students at the close of camp decided to remain as a "lumber jack" at a neighboring camp and get off his experience. He will be there during the fall and winter. The other seniors found jobs in other logging camps elsewhere in the Adirondacks or in New England.

One of the pleasant features of the camp was the fact that the professors in charge were on the same footing as the students. The boys built a dam and every morning between 5 and 6 o'clock, faculty and students rose and took an icy plunge in the stream. Most of the men were athletically inclined. One is a crew man, two are on the varsity swimming team, one is an inter-collegiate miler and another is on the cross-country team. Long tramps to places of interest, from the point of view of logging, were taken on several occasions and the professors held their end of the affair up well, even if competing with such a well set-up, muscular lot of young men. A man who visited the camp said that they were indeed the "cream" of Cornell students as to physical development.

One of the features of the camp was the camp fire. On the last night, an immense camp fire was built and all the lumber jacks in the camps around were invited over. About a hundred came. They sang songs and did stunts. Many of the lumbermen were Canadian and French.

When camp broke up the boys went to Dickenson, where the camp cook lived, and gave a free concert to show their esteem and affection for him. Everybody in town came. What took especially well was the college yells. The Cornell boys gave their own and every other yell they could think of and then made up some when the audience kept on clamoring for more.

The three faculty members who carried the burden of the work in camp were Professors A. B. Recknagel, J. Bentley, Jr., and Samuel N. Spring.

The student body numbered fifteen seniors and five graduate students. The latter will receive the degree of Master in Forestry in February, 1916.

#### WOODSTOCK'S LAUDABLE WORK

Woodstock, Vermont, a village of about 1,700, has an Improvement Society, which for several years has kept the streets and little squares and corners of the village immaculately neat, and has done a number of other interesting and useful things. This society has now decided to establish in the center of the village what it will call, for lack of a better name, a Botanical Garden. Its purpose is to call attention through this garden to the value for decorative purposes of native trees, shrubs, flowers, ferns, mosses and climbers.

# Editorial

## THE WOODLOT AND THE SMITH-LEVER BILL

SINCE 1862 the national government has made annual appropriations for the encouragement of agricultural experiment stations. In 1890 these amounts were increased and the scope of the work extended. The policy underlying these appropriations has been the uplifting of the entire practice of agriculture through the dissemination of useful and practical information among the farmers.

In the course of fifty-three years of trial the problem as to how to reach the farmer most effectually has at last been solved. Not by issuing bulletins crammed with useful facts—though these have their place—not even by public addresses at farmers' institutes—though the personal contact thus secured did far more than the written word—have the best results been obtained, but by the method of personal work with the individual on his own farm—by local demonstration of the methods advocated.

In 1914 Congress sanctioned this final step, by passing the Smith-Lever bill. The funds provided are forthcoming whenever state legislatures, colleges, local authorities, associations or individuals in a state first contribute an equal amount. The money must be used solely for instruction and practical demonstrations in agriculture and home economics to persons not attending schools or colleges. Only 5 per cent can be spent for publications.

Starting with \$480,000, or \$10,000 for each state, the fund available increases annually, by half a million dollars until, inclusive of the original sum, it reaches a total of \$4,590,000 per year. The surplus above \$10,000 is to be proportioned between states on the basis of the rural population, as determined by the last census.

To forestry, this legislation presents a tremendous opportunity and a great responsibility. Under the terms of the law, subjects relating to agriculture may be dealt with, and under this head comes the farmer's woodlot. The value of the woodlot to the farmer is expressed in many ways. It furnishes fuel, at the same time providing employment for labor in the winter or slack season. This enables the retention of help the year round. Fence posts and other local supplies are produced, or the better class of logs sold profitably to woodworking industries. The grove affords protection, acting as a wind-break, reducing evaporation and giving shelter to stock in adjoining fields.

The presence of a woodlot adds to the desirability and sale value of the farm and this advantage increases in regions otherwise treeless. It makes life more worth living to own even a small tract of woodland from which grazing is excluded, and which soon becomes the home of many wild plants, flowers and birds.

No matter how rich the soil, it will pay every farmer to devote a portion of his acres to a woodlot; and when, for any reason, he possesses waste land—either the steep banks of streams, or ravines, or rocky patches, he should think twice before condemning these areas to a policy of denudation and grazing.

The aggregate amount of waste land owned as portions of farm units is enormous. Scattered as it is in small tracts, it will never be possible for either state or nation to own and manage these true forest areas, for the cost of administration would be prohibitive. The farm owner is the man to do it. The time and attention required fits in with the economy of the farm unit. This means efficiency. Every land owner owes it as a duty, not only to himself, but to the community to make his acres productive—yet through lack of interest or incentive he too often neglects altogether the potentialities of his forest land, permitting it to burn over or to seed up with tree weeds of little value even for fuel.

If the plan of personal demonstration and persuasion is applied to the problem of the farmer's woodlot *the same beneficial results will follow as have already been secured by the county agents operating under the Smith-Lever appropriations.* But this work should be done directly by trained foresters. The agricultural agent, engrossed in his subject, can be expected at most to give the woodlot problem his sympathetic appreciation, but should not be required to add technical forestry to his attributes.

The state experimental stations, or the state legislatures, should promptly appropriate funds sufficient in each state to employ at least one technical forester next year in addition to the present state organization such as it may be. This forester, working under the direction of the proper authority, to be determined for the individual state, should devote his entire time to woodlot forestry, along the same lines as are now pursued by the agricultural agents. If the work is started in this manner, it will become permanent. Forestry should ultimately claim from 10 per cent to 20 per cent of the Smith-Lever funds, which would provide for an ultimate annual expenditure per state of from \$10,000 to \$20,000 plus an equal amount by the state. In populous states this amount is proportionately increased.

It is squarely up to the existing State Forestry Departments, and state agricultural experiment stations to take the initiative in securing these state and federal funds and placing upon a firm basis the entire movement for better and more efficient management of the farmer's woodlot.



## Canadian Department

By ELLWOOD WILSON

There was never a time when the sentiment for adequate protection of the forests from fire was so strong in Canada as at present. The hand writing has begun to appear on the wall and it would be well if those in charge of and responsible for the protection of this country's great forest wealth would realize that this is no political question that can be dallied with and used as a means of getting votes, but must be squarely and fearlessly faced. The forests are the heritage of the people and they will not see them destroyed. They know where the responsibility lies and will demand a strict accounting. Those Provinces which are drawing the bulk of their revenue from their forests and doling out a mere pittance for fire protection or are using the positions of fire rangers for patronage had better begin to wake up.

This is a question which stockholders of lumber companies, pulp and paper companies, and all other wood working industries should look into. Are their dividends being paid out of their forest capital? Are their woodlands, the base on which all such companies stand, being exploited to provide cheap raw material for a few years or are they being properly handled and conserved for a continuous supply. Bondholders demand that all buildings and plants shall be kept insured. Do they take care to see that the timber holdings of issuing companies are properly protected against fire? If not they are poor security. Banks should not accept as collateral for loans timber limits which are not properly protected and this means that only those in British Columbia, New Brunswick and Quebec and in the latter Province only those patrolled by the Co-operative Fire Protective Association.

On the 2nd of December a meeting of the St. Maurice Forest Protective Association was held in Three Rivers to discuss amendments necessary to make the fire laws of Quebec effective. There were present at this meeting the presidents or managers of most of the Member Companies, and the weak points in the present law were thoroughly discussed and means to strengthen them carefully worked out. The greatest difficulty in the law now is that only a maximum fine of fifty dollars, at the discretion of the magistrate, is provided for all infractions of the fire code, with the result that flagrant offenders are let off with a fine of one dollar. A case in point is that of a man who confessed that he set fire to the forest deliberately in order to obtain work in putting it out and the magistrate fined him five dollars and costs, amounting to about fifteen dollars.

The county magistrates regard infractions of the fire laws so lightly that there should be no option at all in regard to the fine, which should be fixed by the statute and imposed on every guilty person. It was especially recommended that no one should be allowed to set a fire for clearing purposes, at any time between the first of April and the fifteenth of November without a permit from a fire ranger or other Government official duly authorized to issue them. This would in no way affect the liberty of the farmer or put him to any inconvenience, but would mean that the ranger would be responsible and would have to see that the burning took place at a safe time and in a manner to prevent the fire from spreading. There is at present no way in which a fire ranger can get help except by paying whatever a man chooses to ask, and it was suggested that every able-bodied man must help fight fire when called on, by a duly authorized ranger and for a reasonable daily wage, under penalty of a fine. At present no distinction is made by the code between accidental and deliberate setting of fires and the meeting felt that this was unjust and that in cases where it was proved that a man set a fire on purpose the penalty should be a jail sentence without the option of a fine. It is ridiculous that a man who sets fire to a small shed should be guilty of a serious crime while he who sets fire to a tract of forest, worth thousands of dollars, is only guilty of a misdemeanor punishable by a fine of up to fifty dollars. It was felt that this whole question of amendments to the law should be carefully considered by all those at interest and it was decided to issue invitations to all those interested to meet at the Hotel Windsor, Montreal, on the fifteenth of December to discuss the whole matter thoroughly and to decide on the best way to present the matter to the Government.

On the 3rd of December the Dominion Forests Products Laboratory at McGill University in Montreal was formally opened by the Minister of the Interior before a distinguished gathering. An inspection of the timber testing machines, paper mill plant, museum and laboratories was made, the whole declared formally open and then lunch was served at the Mount Royal Club at which the speakers were the Hon. Minister of the Interior, Chancellor Sir William Peterson of McGill University, the Hon. Sydney Fisher, ex-Minister of Agriculture; the President of the Society of Chemical Industry, Dean Baker of the New York State College of Forestry, and Mr. R. H. Campbell, Director of the Dominion Forestry Branch. This

very important undertaking of the Dominion Government will do much to aid closer utilization and the elimination of waste in the wood using industries and already they are looking to it for information and help. The installation is very complete and modern and reflects great credit on Mr. R. H. Campbell and Dr. Bates. The experimental paper mill is very complete with beaters, paper machine and all the necessary accessories, there is a complete plant for testing structural timbers, chemical laboratories, preserving plant, pathological and microscopical laboratories and drafting and photographic rooms. The laboratories have been informally in operation for nearly a year and much valuable work accomplished.

Thirty-five per cent of the professional foresters of Canada have already enlisted, a better showing than that of any other profession.

The Canadian Forestry Association, Commission of Conservation, Canadian Timbermen's Association and the Canadian Society of Forest Engineers, will all hold their meetings in Ottawa, January 17th, 18th and 19th, and there will be a joint banquet on one of these evenings.

The New Brunswick Government will decide in a very short time on a man who will fill the position of Provincial Forester. It is likely that a New Brunswick man will be chosen and the work of inventorying New Brunswick's forest resources will be begun at once.

In the development of the new hydro electric plant of the Laurentide Co. some ten miles of shore line have had to be cleared off and the debris disposed of, and advantage is being taken of this to experiment in brush burning and it is hoped some valuable information will be obtained. All wood cut is sorted carefully so as to get the greatest value from it, spruce, fir and poplar is being used for pulp wood, hemlock for ties, cedar for telephone and fence posts, hard woods for saw timber and fire wood.

### British Columbia Notes

The heavy orders for lumber for the United Kingdom placed through the Provincial Government during the past summer as a result of the visit of Lumber Commissioner MacMillan to Europe show what results can be obtained by Governmental action in assisting the lumbering industry. In order to follow up the advantage already gained in this new line of work the Hon. W. R. Ross announced that the Provincial Government is sending a business representative of the industry to London.

Investigation has already shown that before the European market can be entered, on any scale, by our manufacturers a great deal of preliminary work must be done in

explaining to buyers the qualities and methods of manufacture of our British Columbia woods. There are many misconceptions which are very prevalent and which act as a barrier to the introduction of our lumber products. These can only be overcome by energetic personal work among the buyers by a representative thoroughly conversant with every phase of our lumbering industry.

Mr. J. G. Woods, the well-known lumberman, has been appointed as the new Lumber Commissioner to the United Kingdom. Mr. Woods has been long and intimately connected with the lumber business of the Coast. After being Manager of the Leamy and Kyle Company, one of the first mills established at Vancouver, he became Manager of the Moodyville Sawmills, and was for many years engaged in the cargo export trade, an experience which is of particular value in view of his present mission. Mr. Woods was subsequently owner and manager of the firm of Woods and Spicer, shingle manufacturers. He thus brings to his task a thoroughly practical knowledge of all branches of the industry whose interests he will further in the European market. The new Commissioner's duties also include the carrying out of various arrangements made with the British authorities in connection with the lumber orders placed through the Department.

#### Book Reviews

Under the Red Cross Flag. By Miss Mabel T. Boardman. 330 pp., illustrated, price \$1.50. J. B. Lippincott Company, Philadelphia.

Miss Boardman's book is introduced in a brief foreword by President Wilson, who, in his capacity of president of the American Red Cross, places the stamp of his authority upon Miss Boardman's narrative.

From 1881, when the society was created, to 1905, when by act of Congress it was reincorporated, the society had neither membership nor organization. Since 1905 the American Red Cross Society had extended its usefulness over many important fields of relief, and generally improved its efficiency by more systematic methods.

Miss Boardman, after a retrospective chapter on the modes of caring for the wounded in ancient times, which brings the résumé down to the days of Florence Nightingale, opens her story with the treaty of Geneva. She regards as the precursor of the Red Cross the American Sanitary Commission, which instituted preventive measures. She discusses the service of women in war and recites the disasters of the American Red Cross' early efforts. A glance is given to the relief methods of other nations, and a tribute is paid to the "miraculous" work of Doctor Strong in Serbia and his victory over typhus fever.

## The New American Forestry

*What some of our members think of the improvement in the Association's Magazine*

"Copy of the September issue of AMERICAN FORESTRY has reached us, and we wish to compliment you on the attractive and interesting magazine that you are now getting out."

THE SOUTHERN LUMBERMAN,  
Nashville, Tennessee.

"I note with pleasure the great improvement in the AMERICAN FORESTRY magazine. At last there is coming a magazine that will tell the man who wants to know and not only the man that already knows all about the great subject that soon must be learned of by all. . . . Your Bird Department is also one that is exceedingly interesting. I would not now be without your magazine. In fact, you now have a conservation magazine that it will be a pleasure to recommend to the members of our Association."

OLON L. PARKES, *Executive Secy.,*  
Berks County Conservation Assn.,  
Lyon Station, Pa.

"I think the new style of AMERICAN FORESTRY very attractive and the reading matter splendid."

J. R. GUYER,  
York, Pa.

"I want to add my congratulations to those of the many other readers of AMERICAN FORESTRY in the change made in the size and quality of your magazine. I have been a subscriber to this magazine for a number of years and this is my first opportunity to look over the last two or three editions. You surely have made AMERICAN FORESTRY a valuable and attractive magazine and you certainly deserve the hearty thanks of all true lovers of forestry."

F. J. ANGER, *Sec.-Treas.,*  
American Wood Preservers' Assn.,  
Baltimore, Md.

"The new dress is fine, but I was satisfied with the old one, which had dignity and character in the make-up and was moreover of convenient form and size; yet the new form indicates a larger vision and so a larger field of usefulness and I wish you god-speed in your greater work for nature and the nation."

WILLIAM RUTHERFORD SAVAGE,  
Blowing Rock, N. C.

"The larger style magazine is a dandy and I wouldn't be without it."

GEORGE B. HARTMAN,  
Edyville, Iowa.

"The enlarged and improved AMERICAN FORESTRY has reached me and is a 'hummer'."

CLARENCE B. TREAT,  
New York City.

"The new form of the magazine is a fine improvement."

EMANUEL FRITZ,  
Missoula, Montana.

"The new magazine is wonderful—simply splendid, and every number is an added source of pride to me as a member of the Association. You are surely going ahead by leaps and bounds. It should have a large sale outside of the regular membership of the Association, for it deals so ably with a subject in which so many are interested."

C. L. LARZELERE,  
Los Angeles, California.

"The new AMERICAN FORESTRY marks a great step in advance, and I wish to congratulate you upon the steady progress you have been making with this magazine, both from the standpoint of beauty as well as in character. You are to be congratulated on the ability you have shown in constantly improving what has always been a very excellent magazine."

JOSEPH N. TEAL, *Chairman,*  
Oregon Conservation Commission,  
Portland, Oregon.

"The new magazine is very beautiful indeed and we are sure that you will not regret having changed the style."

BOLLING ARTHUR JOHNSON, *Editor,*  
Lumber World Review, Chicago, Ill.

"Permit me to congratulate you on the greatly improved appearance of AMERICAN FORESTRY. I have always derived a great deal of pleasure from the publication, and as a member of the Association am proud of its increased value and beauty. The change should tend to increase interest, not only in the magazine and the Association, but also in the general subject of forestry."

GEORGE S. HUMPHREY,  
New York City.

"I have just returned from a summer spent in the West and have been glancing over (more thorough reading later) AMERICAN FORESTRY for August and September. The typography, illustrations, and general 'make-up' as to reading matter, advertisements, etc., leave little to be desired. All this is excellent and I wish to congratulate you most cordially."

WILLIAM R. LAZENBY,  
Columbus, Ohio.

"I think your magazine in the new form shows a great improvement. It is much more attractive in appearance, and I find that the articles interest me much more than formerly."

O. T. SWAN, *Secretary,*  
Northern Hemlock and Hardwood  
Mfrs. Assn., Oshkosh, Wisconsin.

# Current Literature

## MONTHLY LIST FOR DECEMBER, 1915

(Books and periodicals indexed in the library of the United States Forest Service.)

### FORESTRY AS A WHOLE

*Proceedings and reports of associations, forest officers, etc.*

India—Forest dept. Quinquennial review of forest administration in British India for the period 1909-10 to 1913-14, to which is appended the annual return of forest statistics for the year 1913-14. 43p. diagr. Simla, 1915.

### Forest Education

Georgia, University of—State college of agriculture—Extension division. Correspondence courses in agriculture: farm forestry, lesson 1.—The tree. 8 p. Athens, Ga., 1915.

Idaho, University of—School of forestry. Announcements concerning the courses to be offered in forestry. 1915-1916. 16 p. il. Moscow, Id., 1915.

Minnesota, University of—College of forestry. Announcement, 1915-1916. 26 p. Minneapolis, Minn., 1915.

Montana, University of—Forest school. Short course for forest rangers: announcement, 7th, 1916. Missoula, Mont., 1915.

Washington, University of—College of forestry. Announcement, 8th session, January 3 to March 28, 1916; practical short courses in forestry, logging and lumbering. 4 p. Seattle, Wash., 1915.

### Forest Description

Barton, J. E. The forests of Kentucky. 2 p. Frankfort, Ky., 1915. (Kentucky—State forester. Circular 3.)

### Forest Investigations

Japan—Dept. of agriculture and commerce—Bureau of forestry. Extracts from the bulletin of the forest experiment station, Meguro, Tokyo. 221 p. il., pl., diagr. Tokyo, Japan, 1915.

### Studies of species

Mattoon, Wilbur R. Shortleaf pine: its economic importance and forest management. 67p. il., pl. Wash., D. C., 1915. (U. S.—Dept. of agriculture. Bulletin 308.)

North Carolina—Geological and economic survey. Loblolly or North Carolina pine. 2 p. Chapel Hill, N. C., 1915. (Press bulletin 149.)

Stuckey, H. P. Pecans: varieties, influences of climate, soil, and stock on cion. 30 p. il. Experiment, Ga., 1915. (Georgia—Agricultural experiment station. Bulletin 116.)

### Forest Influences

Wicks, Moyer. Deforestation and reforestation as affecting climate, rain and production. 11 p. Austin, Tex., 1915.

(Texas—Dept. of agriculture. Bulletin, n. ser., no. 17.)

### Forest Mensuration

McKenzie, H. E. A discussion of log rules: their limitations and suggestions for correction. 56 p. Sacramento, Cal., 1915. (California—State board of forestry. Bulletin no. 5.)

### Forest Protection

#### Insects

Glenn, Pressley A. The San José scale. 24 p. il., pl. Urbana, Ill., 1915. (Illinois—Agricultural experiment station. Circular no. 180.)

#### Diseases

Fawcett, Howard S. Melaxuma of the walnut, *Juglans regia*: a preliminary report. 16 p. il. Berkeley, Cal., 1915. (California—Agricultural experiment station. Bulletin 261.)

#### Smoke and vapors

Holmes, J. A., and others. Report of the Selby smelter commission. 528 p. il., pl., maps, diagr. Wash., D. C., 1915. (U. S.—Dept. of the interior—Bureau of mines. Bulletin 98.)

### Forest Legislation

United States—Dept. of agriculture—Forest service. State forestry laws; Idaho, through regular session, 1915. 5 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; New Jersey, through regular session, 1915. 7 p. Wash., D. C., 1915.

### Forest Administration

Fernow, Bernhard Eduard. Cooperation in forestry. 9 p. Ottawa, Canada, Commission of conservation, 1915.

Kentucky—State forester. Progress of forestry in Kentucky. 6 p. Frankfort, Ky., 1915.

United States—Dept. of agriculture—Forest service. Government forest work. 19 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. National forests by districts. 9 p. map. Wash., D. C., 1915.

### Forest Utilization

Forest products federation. Report of committees 1 and 3. Chicago, Ill., 1915.

#### Lumber industry

Smith, Franklin H. Teak in Siam and Indo-China. 21 p. Wash., D. C., 1915. (U. S.—Dept. of commerce—Bureau of foreign and domestic commerce. Special agents series no. 108.)

#### Wood-using industries

Lockwood's directory of the paper, stationery and allied trades. 41st ed. N. Y., Lockwood tr. jour. co., 1916.

### Forest by-products

Vermont Maple Sugar Makers' Association. Proceedings of the 21st annual meeting, January 6-7, 1914. 48 p. St. Albans, Vt., 1914.

### Auxiliary Subjects

#### Irrigation

United States—Reclamation service. Cooperative investigations in California: U. S. Reclamation service in cooperation with the Northern California irrigation association.—Report on Lower Pit River project. 55 p. pl., maps. Wash., D. C., 1915.

#### Erosion

Miller, M. F. The control of soil washing. 12 p. il. Columbia, Mo., 1915. (Missouri—Agricultural experiment station. Circular 78.)

### Periodical Articles

#### Miscellaneous periodicals

Annals of botany, Oct., 1915.—On the ribbing of the seed of Ginkgo, by M. F. A. Affourtit and H. C. C. La Rivière, p. 591-5.

Botanical Gazette, Nov., 1915.—The influence of the tannin content of the host plant on *Endothia parasitica* and related species, by Melville Thurston Cook, and Guy West Wilson, p. 346-61; Studies of *Diospyros kaki*, by Kono Yasui, p. 362-73; The influence of ether on the growth of *Endothia*, by Melville Thurston Cook and Guy West Wilson, p. 412-13. Bulletin of the Pan American union, Nov., 1915.—The saman or rain tree, p. 680-4.

Canadian magazine, Nov., 1915.—Our great national waste, by F. M. Turner, Jr., p. 1-8.

Conservation, Dec., 1915.—Forestry in Japan, by A. Nakai, p. 47.

Country gentleman, Nov. 20, 1915.—Planting idle pastures, by F. F. Moon, p. 1773.

Far eastern review, Oct., 1915.—The deforestation of China, p. 167-70.

Gardeners' chronicle, Oct. 30, 1915.—*Cupressus lawsoniana*, by A. Bruce Jackson, p. 272.

Harper's weekly, Oct. 9, 1915.—Fire fighters, by W. P. Lawson, p. 350-1.

House and garden, Nov., 1915.—Forestry at home; the work to do in any woodlot, by F. von Hoffman, p. 15-17, 60.

In the open, Oct., 1915.—The Norway spruce: its value, how to plant it, facts about growth, advice on cultivation, by George H. Wirt, p. 43-7.

Reclamation record, Oct., 1915.—Tree planting on the Umatilla project, p. 466-7.

Science, Nov. 19, 1915.—The effect of cyanide on the locust-borer and the locust tree, by Wesley P. Flint, p. 726-7.

Technical world magazine, July, 1915.—Making the plains into forests, by A. Fullerton, p. 647-8.

Technical world magazine, Aug., 1915.—Finding uses for waste wood, by René Bache, p. 757-9.



- United States—Dept. of agriculture. Journal of agricultural research, Dec. 6, 1915.—A honeycomb heart-rot of oaks caused by *Stereum subpileatum*, by Wm. H. Long, p. 421-28.
- United States—Weather bureau. Monthly weather review, Sept., 1915.—Influence of a forest on the temperature of an air current, by Michel Lalin, p. 448-9.
- Trade journals and consular reports*
- American lumberman, Nov. 13, 1915.—Effect of various woods on corrosion of nails, by S. F. Acree, p. 27; Australia offers wide field for American lumber, by Franklin H. Smith, p. 31; Taxation and Forestry, by E. A. Selfridge, p. 36.
- American lumberman, Nov. 20, 1915.—Wood blocks treated economically, p. 36-7.
- American lumberman, Nov. 27, 1915.—Devises a new process for creosoting fir, by O. P. M. Goss, p. 65.
- American lumberman, Dec. 11, 1915.—Architects hear talks on the use of wood, p. 30-1; Fire tests of wood at the forest products laboratory, by C. H. Teesdale, p. 33-35; wooden poles found best for electric lines, p. 38; Eastern foresters hold annual meeting, p. 45.
- Canada lumberman, Nov. 15, 1915.—The place of logging engineering in forestry, by Judson F. Clark, p. 37.
- Engineering record, Oct. 16, 1915.—Longleaf pine specification should include density test, by Howard F. Weiss, p. 489-90.
- Hardwood record, Nov. 25, 1915.—Philippine standardizing campaign, by L. R. Stadtmiller, p. 27.
- Hardwood record, Dec. 10, 1915.—Uses of wood by shoemakers, p. 23.
- Lumber trade journal, Dec. 1, 1915.—Creosoted wood block stood the test, p. 11, 13; New cypress grading rules that will go into effect on January 1, 1916, by Southern cypress manufacturers' association, p. 11.
- Lumber world review, Nov. 10, 1915.—Wood preservation; its past, present and future, by F. J. Angier, p. 42-6; Forest industries week at the Panama-Pacific international exposition, p. 47-83; Annual of Southern logging association, p. 83-5; Review of the Federal trade commission's lumber trade inquiry, p. 19-21; Does the lumber industry need radical reorganization to protect both producer and consumer? by E. B. Hazen, p. 21-4.
- Paper, Dec. 1, 1915.—World's production and trade in paper, by Franz Krawany, p. 13-17.
- Paper mill, Nov. 6, 1915.—Bamboo cellulose, by William Raitt, p. 32, 34.
- Philippine trade review, Oct., 1915.—Production and improved methods in the manufacture of copra in the Philippine islands, by James F. Boomer, p. 7-8; A new copra dryer that will revolutionize the production of copra in the Philippine Islands, p. 18-19.
- Pioneer western lumberman, Nov. 15, 1915.—Course in structural timber for engineering students, p. 15; Wood in building construction, by E. A. Sterling, p. 22-3.
- Railway review, Nov. 13, 1915.—Tie preservation on the Baltimore and Ohio R. R., by F. J. Angier, p. 630-3.
- St. Louis lumberman, Nov. 15, 1915.—State forestry associations, p. 62; List of associations and officers, p. 70.
- St. Louis lumberman, Dec. 1, 1915.—Government vs. citizen: national forest timber forced upon an overstocked market by congress, by H. D. Langille, p. 48-50; The forests of Kentucky, by J. E. Barton, p. 72.
- Southern industrial and lumber review, Nov., 1915.—Forestry and deforestation, by Ira G. Shellabarger, p. 17; Texas state forester begins work, p. 19.
- Southern lumber journal, Nov. 15, 1915.—Taxation and forestry, by E. A. Selfridge, Jr., p. 41.
- Southern lumberman, Nov. 20, 1915.—Vertical cylinders vs. horizontal cylinders for the preservation of wood blocks for floors and pavements, p. 29.
- Timber trades journal, Nov. 27, 1915.—"Witches' broom" on willow, by A. D. Webster, p. 805.
- Timberman, Nov., 1915.—Gasoline engine for logging operations, by W. L. Corson, p. 37; Overhead logging, by J. S. O'Gorman, p. 37-9; Novel steel spar skidder, by E. A. Gaskill, p. 39-41; Lidgerwood steel spar skidder, by M. H. Dickinson, p. 48-9; Value of fire protection in pine logging, by Coert DuBois, p. 53-4; Cost accounting methods and operating, by George A. Peck, p. 54-8; Modern camp buildings, by C. S. Martin, p. 58-60.
- United States daily consular report, Nov. 24, 1915.—Arboriculture in Persia, by Ralph H. Bader, p. 776; Improved copra curing in Philippines, p. 777.
- United States daily consular report, Nov. 26, 1915.—Russian wood-pulp and paper situation, by John H. Snodgrass, p. 794-6.
- United States daily consular report, Dec. 1, 1915.—Italian market for American lumber, by William F. Kelley, p. 840-1; Lumber trade's importance to British Columbia, by G. C. Woodward, p. 85-9.
- Veneers, Dec., 1915.—Oak logs for quartering, by J. Crow Taylor, p. 9-10; Veneer band inlays, p. 14.
- West Coast lumberman, Nov. 15, 1915.—United States special agent reports on lumber markets of China, by Franklin H. Smith, p. 21, 26-8; This tells you just how much Douglas fir is sold and where it goes, p. 23; The preservation of log buildings, by Bror L. Grondal, p. 32; Compulsory forest protection considered at San Francisco conference, by C. S. Chapman, p. 36-7; New relationship between the government and the lumber industry, by H. S. Graves, p. 39-40; Timber trade of Holland, by H. R. MacMillan, p. 20; Description of the country's most modern of portable logging camps, p. 21.
- Wood turning, Dec., 1915.—Uses of woods: chestnut, yellow poplar, black gum, sycamore, p. 8-9.
- Wooden and willow ware trade review, Nov. 11, 1915.—Willow culture for Georgia, p. 33-4.
- Wooden and willow ware trade review, Nov. 25, 1915.—Brush making in Troy, N. Y., p. 41-2, 48.
- Wood-worker, Nov., 1915.—Lumber drying and lumber driers, p. 33-4.
- Forest journals*
- Allgemeine forst- und jagd-zeitung, May, 1915.—Absteckung von einseitigen wegwurven, by Friedrich Wilhelm Fürst, p. 105-9; Die gewichtszahlen der forstlichen rentabilität, by E. Kreutzer, p. 109-12; Ueber die abhängigkeit der ertragsregelung und bestandespflege vom versuchswesen, by Hemmann, p. 112-16; Läuterungshiebe und jugenddurchforstungen, by Jürgens, p. 116-20.
- Allgemeine forst- und jagd-zeitung, June, 1915.—Ueber erziehung unserer holzarten in lockerem kronenschlusse (starke durchforstung und hochdurchforstung), by Tiemann, p. 133-44.
- Canadian forestry journal, Nov., 1915.—The working plan of the St. Maurice protective association, by Henry Sorgius, p. 247-9; Sentiment making and forest protection, by E. T. Allen, p. 252-5; Fire loss for 1915, \$10,000,000, in Canada, p. 259-61; A talk on forestry for children, by James Lawler, p. 262-3; Timber in Canada, by R. H. Campbell, p. 265-8.
- Hawaiian forester and agriculturist, Nov., 1915.—Some common woody plants of the Oahu lowlands, by Vaughan MacCaughy, p. 290-2.
- Indian forester, Oct., 1915.—The natural reproduction of sal and how it can be improved, by R. S. Hole, p. 351-61; A note on the cultivation of *Podophyllum emodi*, by R. S. Troup, p. 361-5; The uniform system in Burma, by H. R. Blanford, p. 366-71; The Myodwin teak plantations, Zigon division, Lower Burma, by A. Rodger, p. 372-6; Girdlings by bears, by Daya Ram, p. 382; Damage by porcupines, by Basti Ram, p. 383-4.
- North woods, Nov., 1915.—The effect of forest destruction upon game, by W. B. Douglas, p. 14-16.
- Proceedings of the Society of American foresters, Oct., 1915.—Robert Langdon Rogers, p. 1; The need of working plans on national forests and the policies which should be embodied in them, by Burt P. Kirkland, p. 341-70; Regional forest plans, by D. T. Mason, p. 371-5; Working plans, by H. H. Chapman, p. 376-82; A new aspect of brush disposal in Arizona, and New Mexico, by W. H. Long, p. 383-98; Brush disposal in lodgepole-pine cuttings, by D. T. Mason, p. 399-404; Some notes on forest ecology and its problems, by Richard H. Boerker, p. 405-22; Five years growth on Douglas fir sample plots, by Thornton T. Munger, p. 423-5; Light burning at Castle Rock, by S. B.

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Show, p. 426-33; Uniformity in the forest-fire legislation affecting railroad operation and lumbering, by Philip T. Coolidge, p. 434-52.

Tharander forstliches Jahrbuch, 1915.—Die wichtigsten forsttechnischen und forstpolitischen verhältnisse und massnahmen in der Schweiz mit bezugnahme auf den gegenwärtigen stand der forstwirtschaft im Deutschland, by Heinrich Martin, p. 159-94, 253-80; Rauchwirkung, spätfrost und frostrocknis und ihre diagnostik, by F. W. Neger, p. 195-212.

Zeitschrift für forst- und jagdwesen, May, 1915.—Zur lösung der waldwertrechnungsfrage, by Frey, p. 279-90; Neue studien über die biologie von forstinsekten, by Max Wolff, p. 290-308; Aus dem jahrbuch des Russischen forstdepartements von 1911, p. 309-23; Carl August Hermann Guse, p. 324-37.

Zeitschrift für forst- und jagdwesen, June, 1915.—Zur buchenverjüngung, erfahrungen bei der buchenvollmast 1909, by Ochswadt, p. 343-50; Die versuchsstation der zellstoffund holzchemie in Eberswalde, by Carl G. Schwalbe, p. 350-9; Waldrennabilitätslehre und Hönlinger-theorie, by Th. Glaser, p. 359-75; Die ausbildung für den staatsforstverwaltungsdienst in Württemberg, p. 384-7; Die deutschen forstvereine, ihre letzten versammlungen und beratungsgegenstände, by Dimmek, p. 387-91; Die belgischen waldgemeinden, by Badermann, p. 395-400.

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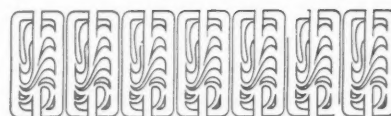
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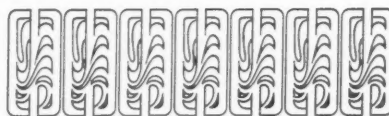


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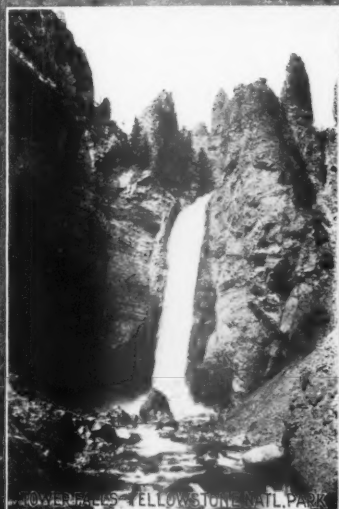
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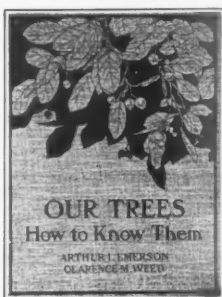
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